

# NYASALAND PROTECTORATE.

---

## Annual Medical Report

ON THE

HEALTH AND SANITARY CONDITION

OF THE

NYASALAND PROTECTORATE

FOR THE

YEAR ENDED 31st DECEMBER, 1913.

---

PRINTED BY  
THE GOVERNMENT PRINTER, ZOMBA, NYASALAND,  
1914.



# CONTENTS.

|                                                                             | PAGE. |
|-----------------------------------------------------------------------------|-------|
| I.—ADMINISTRATIVE—                                                          |       |
| Staff ... ..                                                                | 7     |
| Table I.—Medical Staff ... ..                                               | 8     |
| Table II.—Financial Return ... ..                                           | 9     |
| Table III.—Return of Statistics of Population for the year 1913 ...         | 9     |
| II.—PUBLIC HEALTH—                                                          |       |
| (A) General Remarks— ... ..                                                 | 10    |
| 1. General Diseases ... ..                                                  | 11    |
| 2. Communicable Diseases—                                                   |       |
| Mosquito or Insect-borne ... ..                                             | 11    |
| Infectious or Epidemic ... ..                                               | 16    |
| Helminthic ... ..                                                           | 19    |
| (B) European Officials ... ..                                               | 21    |
| (C) General European Population ... ..                                      | 21    |
| (D) General Native Population ... ..                                        | 21    |
| Table showing Sick, Invaliding and Death Rates for<br>European Officials—   |       |
| Port Herald ... ..                                                          | 21    |
| Blantyre ... ..                                                             | 22    |
| Zomba ... ..                                                                | 22    |
| Fort Johnston ... ..                                                        | 22    |
| III.—SANITATION—                                                            |       |
| 1. Administration ... ..                                                    | 22    |
| 2. Preventive Measures—                                                     |       |
| Mosquito and Insect-borne Diseases ... ..                                   | 23    |
| Epidemic Diseases ... ..                                                    | 24    |
| Helminthic Diseases ... ..                                                  | 25    |
| 3. General Measures—                                                        |       |
| Table IV.—Summary of Routine Sanitary Work done<br>during the year in—      |       |
| Port Herald ... ..                                                          | 27    |
| Blantyre ... ..                                                             | 33    |
| Zomba ... ..                                                                | 39    |
| Fort Johnston ... ..                                                        | 45    |
| IV.—METEOROLOGICAL RETURN FOR THE YEAR 1913 ... ..                          |       |
| V.—HOSPITALS AND DISPENSARIES ... ..                                        |       |
| Table VI.—Return of Diseases and Deaths (In-patients) for the<br>year 1913— |       |
| Port Herald Hospital Hut ... ..                                             | 54    |
| Blantyre European Hospital ... ..                                           | 54    |
| Zomba European Hospital ... ..                                              | 55    |
| Fort Johnston Native Hospital ... ..                                        | 55-56 |
| Zomba Native Hospital ... ..                                                | 56    |
| —————Camp Hospital ... ..                                                   | 57    |
| —————Central Prison ... ..                                                  | 57-58 |

.—HOSPITALS AND DISPENSARIES—*continued*—

Table VII.—Return of Diseases (Out-patients) for the year 1913—

|                                                  |     |     |     |     |       |
|--------------------------------------------------|-----|-----|-----|-----|-------|
| Port Herald, Europeans                           | ... | ... | ... | ... | 58    |
| -----Natives                                     | ... | ... | ... | ... | 59-60 |
| Blantyre, Natives                                | ... | ... | ... | ... | 60    |
| Mlanje                                           | ... | ... | ... | ... | 61-62 |
| Blantyre, Europeans and Asiatics                 | ... | ... | ... | ... | 62-63 |
| Zomba, Europeans                                 | ... | ... | ... | ... | 63-64 |
| Chiromo Dispensary                               | ... | ... | ... | ... | 64-65 |
| Zomba, Natives                                   | ... | ... | ... | ... | 65    |
| -----Camp                                        | ... | ... | ... | ... | 66-67 |
| -----Central Prison                              | ... | ... | ... | ... | 67-68 |
| Fort Johnston                                    | ... | ... | ... | ... | 68-69 |
| Fort Mangoche                                    | ... | ... | ... | ... | 70    |
| Kota Kota                                        | ... | ... | ... | ... | 71    |
| Karonga...                                       | ... | ... | ... | ... | 71-73 |
| Returns of Diseases—Zomba Central Lunatic Asylum | ... | ... | ... | ... | 73    |

## VI.—SCIENTIFIC—

1. Acromegaly, a case of. By Dr. J. B. Davey, Medical Officer, Mlanje ... 74
2. Ankylostomiasis in the North Nyasa district. By Dr. A. G. Eldred, Medical Officer, Karonga. ... 75
3. Filariasis in the Ruo District. By Dr. Sanderson, Medical Officer, Chiromo ... 86
4. Helminthic Infections at Mtumbolende, in the Ruo district. Dr. G. M. Anderson, Medical Officer, Chiromo ... 88
5. Malarial Dysentery, notes on a case of. By Dr. A. H. Barclay, Medical Officer, Blantyre ... 92
6. Observations on Medical Matters in the Dedza District. By J. B. Davey, S S I., Dedza ... 93
7. Pellagra in the Zomba Central Prison. By Dr. H. S. Stannus, Medical Officer, Zomba. ... 104
8. Sleeping Sickness Investigations during the year 1913, a brief review of. By the Principal Medical Officer ... 105

## APPENDIX—

- Return of Cases Treated at Blantyre Mission Hospital, Blantyre ... 109

OFFICE OF THE PRINCIPAL MEDICAL OFFICER,

ZOMBA,

NYASALAND PROTECTORATE,

*26th May, 1914.*

SIR,

I have the honour to submit, for the information of His Excellency the Governor and for transmission to the Right Honourable the Secretary of State, the Medical Report on the Health and Sanitary Condition of the Nyasaland Protectorate for the year ending 31st December, 1913, together with the Returns, &c., appended thereto.

I have the honour to be,

Sir,

Your obedient servant,

H. HEARSEY.

*Principal Medical Officer.*

To

THE HON'BLE THE GOVERNMENT SECRETARY.



# NYASALAND PROTECTORATE.

---

## ANNUAL MEDICAL REPORT.

FOR THE YEAR ENDED 31st DECEMBER, 1913.

---

### I.—ADMINISTRATIVE.

#### STAFF.

*The Medical Staff* comprises :—The Principal Medical Officer : H. Hearsey. Eleven Medical Officers : A. H. Barclay, J. E. S. Old, J. B. Davey, H. S. Stannus, N. Leys, A. G. Eldred, G. M. Sanderson, R. Drummond, R. Bury, J. G. Morgan and P. C. Conran.

*The Nursing Staff* is as follows :—Matron : R. Paterson. Four Nursing Sisters : A. M. Tadman, A. A. Pallot, B. C. Empson and M. Gittins.

*P.M.O.'s Office* :—There has been no Clerk in the Department until the arrival of Mr. P. D. H. Piers in October ; this officer, however, was transferred to another Department in December.

*Medical Store.*—There is no Medical Storekeeper, the work of the Medical Store being carried out by the P. M. O. with the assistance of an Indian Dispenser.

*Subordinate Staff.*—This, as in the past, consists of four Sub-Assistant Surgeons, two of whom are in civil employment, and two are attached to the Troops.

#### PRINCIPAL APPOINTMENTS AND CHANGES DURING THE YEAR.

*Medical Staff.*—Dr. A. H. Barclay has continued in charge of the Blantyre district.

Dr. J. E. S. Old has remained in charge of the Lower Shire and in visiting charge of the Ruvo district.

Dr. J. B. Davey, on arrival from leave, was engaged on Sleeping Sickness investigations in the Dedza district for a period of three months, on the termination of which he was appointed in medical charge of the Mlanje district, relieving Dr. Drummond who has proceeded on leave.

Dr. H. S. Stannus has continued in charge of the Zomba district.

Dr. N. Leys arrived from leave in October, and has been in temporary medical charge of the South Nyasa district.

Dr. A. G. Eldred has been in medical charge of the Mlanje district for a period of three months, after which he proceeded to the North Nyasa district in connection with the investigation of Ankylostomiasis.

Dr. G. M. Sanderson has been in medical charge of the Ruvo district for seven months, and during the remaining five months has been engaged in Sleeping Sickness investigations in the South Nyasa and Upper Shire districts.

Dr. R. Drummond has been posted at Zomba as an additional medical officer for the first three months in the year, and from April to August has been in medical charge of the Mlanje district, thereafter proceeding on leave.

Dr. R. Bury has been in medical charge of the South Nyasa district until the month of September, when he proceeded on leave.

Dr. J. G. Morgan has been in medical charge of the West Nyasa district for three months, and of the Marimba district for the remainder of the year: for a period of three months he was engaged in Sleeping Sickness investigations in the latter district.

Dr. P. C. Conran has continued in charge of Sleeping Sickness investigations in the Dowa district throughout the year.

*Nursing Staff.*—Miss Paterson, the matron, has been in charge of the Zomba Hospital, and was absent on leave for about seven months during the year.

Miss Tadman has been attached to the Blantyre Hospital, and proceeded on leave in September.

Miss Pallot was on leave from January to August, and on return from leave assumed nursing charge of the Blantyre Hospital.

Miss Empson relieved Miss Paterson in May, and took charge of the Zomba Hospital. For the previous four months she was attached to the Fort Johnston Hospital.

Miss Gittins has been posted at the Blantyre Hospital throughout the year.

*P.M.O.'s Office.*—The Clerk arrived on the 6th October and was transferred to another Department on the 18th of December; his services were therefore available for a period of about ten weeks during the year.

*Medical Store.*—There is no Medical Storekeeper.

*Sub-Assistant Surgeons.*—S.A.S. Varyam Singh has been in charge of the Civil Dispensary at Zomba, and proceeded on leave in November.

S.A.S. Bir Singh, on arrival from leave in November, relieved S.A.S. Varyam Singh.

S.A.S. Hira Singh has been in sub-medical charge of the Troops at Zomba.

S.A.S. Kishan Singh has been in sub-medical charge of the detachment of Troops at Fort Mangoche.

#### TABLE.—I MEDICAL STAFF.

*Principal Medical Officer:* H. Hearsey,

*Medical Officers:*

|               |                 |
|---------------|-----------------|
| A. H. Barclay | A. G. Eldred    |
| J. E. S. Old  | G. M. Sanderson |
| J. B. Davey   | R. Drummond     |
| H. S. Stannus | R. Bury         |
| N. Leys       | J. G. Morgan    |

P. C. Conran

## NURSING STAFF.

*Matron* : R. Paterson.*Nursing Sisters* :

|              |              |
|--------------|--------------|
| A. M. Tadman | B. C. Empson |
| A. A. Pallot | M. Gittins   |

## SUB-ASSISTANT SURGEONS.

|                   |                     |
|-------------------|---------------------|
| S.A.S. Bir Singh  | S.A.S. Varyam Singh |
| S.A.S. Hira Singh | S.A.S. Kishan Singh |

## TABLE II.—FINANCIAL RETURN.

The estimated expenditure of the Medical Department for the year 1913-14 was as follows :—

*PERSONAL EMOLUMENTS.*

|                          | £     | s. | d. |
|--------------------------|-------|----|----|
| European Staff ... ..    | 6,762 | 0  | 0  |
| Subordinate Staff ... .. | 807   | 0  | 0  |

*OTHER CHARGES.*

|                                             |     |   |   |
|---------------------------------------------|-----|---|---|
| Travelling ... ..                           | 400 | 0 | 0 |
| Passages ... ..                             | 715 | 0 | 0 |
| Drugs, Instruments, &c ... ..               | 350 | 0 | 0 |
| Calf Lymph ... ..                           | 99  | 0 | 0 |
| Scientific Research Apparatus ... ..        | 56  | 0 | 0 |
| Upkeep of Hospitals and Dispensaries ... .. | 191 | 0 | 0 |
| Incidental Expenses... ..                   | 176 | 0 | 0 |

*EXTRAORDINARY.*

|                          |          |   |   |
|--------------------------|----------|---|---|
| Sleeping Sickness ... .. | 500      | 0 | 0 |
| Total                    | £ 10,056 | 0 | 0 |

It is not yet possible to say what the actual expenditure has been during the 1913-14 financial year.

*Revenue.*—This is derived entirely from hospital fees and the sale of medical stores, and is estimated at about £43.

## TABLE III.—RETURN OF STATISTICS OF POPULATION FOR THE YEAR 1913.

|                                   | Europeans<br>and Whites | Africans. | Asiatics. |
|-----------------------------------|-------------------------|-----------|-----------|
| Number of Inhabitants 1913 ... .. | 798                     | 1,063,912 | 387       |
| „ „ Births 1913 ... ..            | 25                      | No record | 1         |
| „ „ Deaths 1913 ... ..            | 7                       | „ „       | 4         |
| „ „ Immigrants 1913 ... ..        | 270                     | „ „       | 109       |
| „ „ Emigrants 1913 ... ..         | 248                     | „ „       | 75        |
| „ „ Inhabitants 1912 ... ..       | 758                     | 1,020,537 | 356       |
| Increase ..                       | 40                      | 43,375    | 31        |
| Decrease ...                      | —                       | —         | —         |

## SECTION II.—PUBLIC HEALTH.

## (A). GENERAL REMARKS.

The health of the Protectorate has been entirely satisfactory during the year; no outbreaks of epidemic diseases have been reported and no appreciable sickness, as a factor in the death-rate, has come to the notice of Medical Officers who have been engaged on special investigations in many parts of the country, and who have therefore had opportunities of gaining an insight into the prevailing diseases of rural areas.

Helminthiasis, with special reference to ankylostome infection, has now been investigated in several districts, and the results are shown in tabular form in their appropriate place. These investigations point to Ankylostomiasis prevailing with about equal intensity throughout the Protectorate, but seldom giving rise to the manifest morbidity usually associated with this infection. A paper dealing fully with Ankylostomiasis work inaugurated in the North Nyasa district will be found under Section VI; also a paper on Helminthic Infections in the Ruvo district.

An investigation into the prevalence of Filariasis, in a selected area, has also been undertaken; and the results are embodied in a paper in Section VI. These observations were made among a riparian population in the Ruvo district; and it is now proposed to extend them to the South Nyasa district, at the southern extremity of the Lake.

In this Section will also be found a paper on Pellagra, a disease which enquiries have so far shown to be confined to the Central Prison at Zomba, and to be of an institutional nature.

With regard to Sleeping Sickness; sixty-four cases have been reported during the year; 49 from the "Proclaimed Area" of the Dowa district, 11 from the Marimba and 2 each from the South Nyasa and Upper Shire districts. So far, there happily appears to be no tendency to any spread of the disease, although the number of cases found in the Marimba district, during a three months investigation, point to this district being as heavily infected as the Proclaimed Area. A brief review of Sleeping Sickness investigations which have been carried out during the year will be found under Section VI.

Of infective diseases it is satisfactory to record that no case of small-pox has occurred in the Protectorate in the year under review, with the exception of a solitary case in its extreme southern portion, the patient having arrived at his village after acquiring infection in the adjoining Portuguese territory. Precautions were immediately taken to prevent any spread of infection, with a completely successful result.

There has now been no recurrence of small-pox in Nyasaland, in epidemic form, since the year 1909, when, after urgent representations, systematic vaccination of the general population was first adopted. Five years of freedom from a disease which hitherto was rightly regarded as the chief scourge among the natives, is something to have attained for a recurring outlay of about £200 per annum for the wages of Native Vaccinators, and an additional £100 for the purchase of lymph. In the absence of vital statistics the resultant effects of this far-reaching measure can now only vaguely be realized. The loss of life directly occasioned, and in the case of pregnant women the occurrence of abortion and miscarriage, were, as I pointed out in the year 1908, serious factors militating against a natural increase of population; to say nothing of the disfigurements and loss of vision, partial or complete, that followed in the train of each recurring epidemic. This freedom from small-pox, it may be repeated,

has been secured by an outlay of £300 per annum ; and one of the principal factors conducing to the suppression of a normal increase of population has by this means been overcome.

The aggregate number of vaccinations performed during the year was 143,502, as compared with 132,992 in the previous year, and 107,687 in the year preceding. All these with but few exceptions were primary operations. The average degree of success obtained was somewhat higher than in the past year, the percentage of success necessarily varying with the skill of individual vaccinators.

Of other diseases (excluding injuries and the commoner skin affections), the chief causes of sickness, in order of frequency, were digestive and bowel complaints, bronchitis, malaria, dysentery and syphilis.

Among the diseases with increased admission rates were malaria, respiratory disorders, venereal diseases and tuberculosis. On the other hand the admission rates from chicken-pox and measles were considerably lessened, and in the case of small-pox were represented by zero.

Malarial fever gave rise to nearly 5.64 per cent of the total admissions ; the most malarial months being January, February and May ; the seasonal incidence of malaria being as usual most marked at the height of, and shortly after, the rainy season.

Before concluding these remarks it is perhaps advisable to point out that with the opening up of the country by railways and roads, the frequent and rapid inter-communication which must inevitably follow will result in the spread of contagious and infectious diseases to a relatively greater extent. So that while funds are expended on these works of public utility the need for making concurrent provision for public health measures should not be lost sight of. Sanitation in the tropics has made such rapid progress in recent years and, sanitary work has assumed so specialized a character that the appointment of a duly qualified Sanitary Officer for Nyasaland should no longer be delayed. In addition to the sanitary supervision of the townships in the Protectorate the larger question of rural sanitation has to be borne in mind. And in order to effectively control sanitary developments of so widespread a nature it is necessary that an officer should devote his whole time to the work. This has now come to be recognised as a necessity in all other Colonies and Protectorates, and the medical and sanitary reports recently published plainly show the impetus which is now very properly being given to tropical sanitation.

## (1). GENERAL DISEASES.

*Anaemia.*—There were 29 cases of Anaemia recorded ; the condition however can hardly be regarded as a disease, *per se*, being usually secondary to chronic malarial infection, helminthic invasion of the bowels, spirochaetosis, and to similar causes. One case of *Myxaedema* was returned from the Marimba District.

## (2). COMMUNICABLE DISEASES.

### MOSQUITO OR INSECT-BORNE.

*Malaria.*—757 cases of malaria have been recorded in 1913, as against 558 in the previous year, and 808 in the year preceding. These 757 cases were distributed as follows : 30 among the European officials and their families, and 79 among other Europeans, leaving a balance of 642 cases for the native and Asiatic population. Blantyre gave a total of 41 cases among Europeans, and Zomba, 20 ; but these returns are not to be taken as showing the actual incidence

of malaria among members of this community, a proportion of cases being self-treated and therefore not coming under notice. There can be no question, however, but that owing to the general adoption of the prophylactic use of quinine, more especially by officials and their families, malarial infections are beginning to decline not only in numbers but in the severity of attacks. Among the cases treated there were two deaths: one European, who, when visited, was *in extremis*, and who died of hyperpyrexia; and one native, an infant.

*Blackwater Fever.*—Seven cases of blackwater fever, comprising six Europeans and one Asiatic, came under treatment during the year, as against eleven in the previous and five in the preceding year. Four of these patients had previously had one attack of blackwater fever, periods of 14 months, 7 years, 7 years and 10 years, respectively, having intervened between the two. In the remaining three, it was the first attack. Four of the patients were planters by occupation; one a Portuguese officer; one an employee of the Portuguese Nyasa Company; and one an Assistant Station Master (Indian) on the Shire Highlands Railway. As regards seasonal incidence, three of the cases occurred during the rains; one shortly after the wet season; two during the fairly cool, and one during the warm, dry season. With reference to locality, five of the cases occurred in the Shire Highlands (one of these, however, developed his attack immediately on arrival from the low-lying country round Lake Chiuta); one on the lower river; and one at the south-eastern border of the Lake. Of these seven cases, six recovered, and one (Indian) died.

*Filariasis.*—It will be noted that while only three cases are reported as having come up for treatment, Dr. Sanderson, during the period he was Medical Officer of Chiromo, investigated the prevalence of filarial infections among natives in the immediate neighbourhood. His paper, dealing with this infection among the “lower river” natives, appears under Section VI of this report. In the current year observations on the existence or otherwise of Filariasis in the South Nyasa district, which lies at the southern end of Lake Nyasa, will be undertaken; Dr. Leys will conduct similar enquiries at the northern extremity of the Lake, in the North Nyasa district.

*Yellow Fever* is fortunately not known to exist in the Protectorate, as the domestic mosquito, *Stegomyia fasciata*, is present in most houses.

*Tick Fever.*—Only ten cases have come to the notice of Medical Officers: but the disease as pointed out in previous reports, has a wide prevalence in some of the Lake districts where it is responsible for a great deal of sickness. During an investigation of the Dowa district, for example, it was found on blood examination that more sickness was due to spirochaete infection than to malaria. Special precautions have to be taken to free the prisons in the Lake districts of these ticks, but only with partial success.

*Trypanosomiasis.*—The number of cases of Sleeping Sickness recorded up to the end of the year 1913 has now reached an aggregate of 172. Of this total 64 cases were notified in 1913, as against 46 in the previous year, and 38 in the year preceding.

The following Table shows the returns of cases by months, from the year 1908. It needs to be borne in mind however that a systematic investigation was not commenced till the middle of 1910, and that its continuity has been maintained only in the “Proclaimed Area” of the Dowa district, other districts having been investigated for comparatively short periods.

| Year.                                                 | Jan. | Feb. | Mar. | Apr. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. | Total. |
|-------------------------------------------------------|------|------|------|------|------|-------|-------|------|-------|------|------|------|--------|
| 1908                                                  | —    | —    | —    | —    | —    | —     | —     | —    | —     | 1    | —    | 1    | 2      |
| 1909                                                  | —    | —    | —    | —    | 1    | 1     | 1     | 1    | 2     | —    | —    | —    | 6      |
| 1910                                                  | —    | —    | —    | —    | —    | 1     | —     | 3    | 8     | 1    | 1    | 2    | 16     |
| 1911                                                  | 2    | —    | 12   | 5    | 6    | 2     | 2     | 1    | 1     | 1    | 1    | 5    | 38     |
| 1912                                                  | —    | 1    | —    | 1    | 3    | 9     | 9     | 3    | 5     | 3    | 10   | 2    | 46     |
| 1913                                                  | 7    | 6    | 5    | 2    | 6    | 3     | 3     | 13   | 6     | 4    | 4    | 5    | 64     |
| Mon-<br>thly<br>inci-<br>dence<br>for last<br>3 years | 9    | 7    | 17   | 8    | 15   | 14    | 14    | 17   | 12    | 8    | 15   | 12   | —      |
| Total ...                                             |      |      |      |      |      |       |       |      |       |      |      |      | 172    |

Investigations which have been conducted in the fly areas of districts situated to the north and south of the Proclaimed Area in the Dowa district have yielded an aggregate of 15 cases during the year, as compared with 49 cases in the Proclaimed Area.

Of this total of 64 cases, 43 were males and 21 females; that is to say a proportion of about two males to one female, as in the previous year. To particularise still further, the 64 cases comprised 35 adult males, 19 adult females, 2 youths, 5 boys, 2 girls, and 1 infant.

The results of investigations obtained in the year 1913 are shown in the subjoined Table, together with other details.

| Name of Medical Officer. | District investigated. | Duration of investigation. | Number of Cases found. |
|--------------------------|------------------------|----------------------------|------------------------|
| Dr. Morgan.              | Marimba.               | 3 months.                  | 11                     |
| Dr. Conran.              | Dowa (Proclaimed Area) | 12 „                       | 49                     |
| Dr. Davey.               | Dedza.                 | 3 „                        | —                      |
| Dr. Sanderson.           | South Nyasa.           | 2 „                        | 2                      |
| „ „                      | Upper Shire.           | 3 „                        | 2                      |
| Total.                   | —                      | —                          | 64                     |

In this Table the districts are shown in their relative positions, from north to south; and it will be observed that during a period of three months investigations the Marimba district, which is situated immediately to the north of the Proclaimed Area, contributed 11 cases, whereas the three districts situated to the south of Area, namely, Dedza, South Nyasa and Upper Shire yielded a total of but 4 cases.

When it is remembered that these investigations were carried out with the utmost care and by specially selected officers, that the fly areas in all these districts are continuous with one another so that they everywhere coalesce, and that the game as far south as the Upper Shire district has been shown by a member of the Scientific Commission of the Royal Society to be infected with *T. rhodesiense*, the disparity of the results obtained in the north of the Proclaimed Area, and in the districts to the south of this Area, calls for some explanation.

The discovery of 11 cases of Sleeping Sickness in the Marimba district, during a three months investigation, would imply that this district and the Proclaimed Area harbour infected natives to an approximately equal extent. On the other hand the discovery of but 4 cases in the three districts to the south of the Area, during a period of eight months investigations, would lead to the inference that the fly in these extensive areas can hardly be said to be infected with the trypanosome pathogenic to man to any appreciable extent; and this in spite of the fact that the game is everywhere infected with *T. rhodesiense*. This game, *per se*, is held to constitute the natural reservoir of the virus; but neither *per se*, nor *per aliud*, does the mammalian fauna of these districts appear capable of transmitting the organism to man, to at any rate a noticeable degree.

It has been asserted with some confidence that Sleeping Sickness is an old-standing disease in the Protectorate, and has been over-looked. There can be no *a priori* objections to this view; but a statement of this character, to carry conviction, should be duly substantiated by evidence. With the results so far obtained it may, on the contrary, as reasonably be postulated that the disease is only of recent introduction, and that having established a footing in the fly area of Marimba and Dowa districts it is now showing a tendency to extend in a southerly direction.

At this phase of the enquiry it is too early yet to dogmatise on this particular aspect of the question, and further investigations will be necessary before deductions of any value can legitimately be drawn. Speculations are useful in so far as they suggest the need for further enquiry, and it is solely with this object in view that the following hypotheses are advanced.

1. That Sleeping Sickness is of comparatively recent introduction into this country, and so far has obtained a footing only in the fly areas of the Marimba and Dowa districts.

2. That it is now gradually extending into the fly areas in a southerly direction, a circumstance, which by parity of reasoning from the results obtained, may be held to account for the relatively few cases discovered in these southern districts.

3. That the slow rate of its spread may be due to:—

- (a). The rapid course of the disease in man, so that he is incapacitated at an early stage of infection, and, becoming bed-ridden, offers but few opportunities for infecting flies.

- (b). Only a small percentage of flies which have fed on an infected case being capable of becoming infective.

- (c). The migratory habits of *G. morsitans* and the presence of game in fairly large numbers, so that after having become infective for man it can continue to exist on the blood of mammals other than man.

4. That possibly the infection is, normally, mainly communicable from man to man; and that this in itself explains why the disease has not assumed the proportions of an epidemic.

In support of the view that the disease is new to the country it may further be contended that its rapidity of course and invariable fatal termination point to this conclusion; in the same way that the tendency of the disease to run a chronic course in the Gambia and Ashanti may be held to indicate its long existence in those countries.

To illustrate what is here meant I produce the following excerpt from the Gambia Medical Report for the year 1912; Dr. Harley states:—

“I had only one case of this disease under my care . . . the patient was a man of about 35 years of age and was in a very advanced condition when I first saw him. However, under periodic intramuscular injections of Soamin he showed marked improvement both physically and intellectually when I left the Hospital, and has since been discharged. I am inclined to think that cases of Gambia sleeping sickness are very amenable to treatment, but it is impossible to say how long this apparent cure lasts. I know of cases, in which Dr. Todd demonstrated the presence of trypanosomes, which are apparently well and healthy, without having been under any treatment whatever.”

Kinghorn, I believe, also noticed the existence of chronic cases of trypanosome infection in Ashanti.

Nyasaland cases on the other hand show, as we know, a progressively rapid tendency to a fatal termination (with or without treatment); the same apparently holds good for the Uganda disease, where however the fatal issue is perhaps longer postponed. We know, moreover, that the infection in Uganda was of comparatively recent introduction; and it may therefore not unreasonably be argued that the disease is new to Nyasaland also.

It is clear of course that objections can be advanced militating against this view, but the fact remains that on the West Coast a sufficient period of time has elapsed to enable a definite degree of “tolerance” to the disease being acquired; on the East Coast the reverse appears to be the case. And in Nyasaland the problem is further complicated by the fact that here we are dealing not only with a different carrier, but with a specifically different trypanosome.

A list of the cases which have been diagnosed during the year is appended below. There is nothing further to add in reference to our clinical knowledge of the disease; the histories of cases published from time to time in the “Sleeping Sickness Diary” show the frequency with which individual symptoms are observed. Both Sanderson and Conrau emphasize the importance of a symptom first noted by Shircore, namely, enlargement of the epitrochlear glands, and regard this as an important and a ready aid to diagnosis. Of 602 natives recently examined by Sanderson, with special reference to this point, not one was found to have any enlargement greater than  $\times$  — — (small, hard and shotty); this degree of enlargement was however noted in only 1.82 per cent of those examined.

The following is a list of the cases diagnosed in the year 1913:—

| Month            | No. | Name.      | Sex.   | District.   | Village.   | Date.              | Remarks.            |
|------------------|-----|------------|--------|-------------|------------|--------------------|---------------------|
| 1913<br>Jan. = 7 | 109 | Sulemani   | Male   | Dowa        | Asani      | 1913.<br>9 January | 1913.<br>D. 16 Jan. |
|                  | 110 | Ndafanji   | „      | „           | Chidzaye   | 10 „               | D. 17 „             |
|                  | 111 | Mkatafolo  | Female | „           | Kumbemba   | „ „                | D. 3 Feb.           |
|                  | 112 | Mchare     | Male   | „           | Sumaewa    | 13 „               | D. 14 „             |
|                  | 113 | Kabodza    | „      | „           | Kawanga    | „ „                | D. 14 April         |
|                  | 114 | Ndalire    | „      | „           | Mankwazi   | 17 „               | D. 16 Mar.          |
|                  | 115 | Mwalimu    | „      | „           | Chinyama   | 20 „               | D. 3 April          |
| Feb. = 6         | 116 | Topezani   | Male   | Dowa        | Katenjeza  | 13 February        | D. 6 Feb.           |
|                  | 117 | Kampunje   | „      | „           | Chitsala   | 14 „               | D. 17 „             |
|                  | 118 | Anderson   | Youth  | (1) Marimba | Mpondagaga | 18 „               | D. 4 Dec.           |
|                  | 119 | Kuchiko    | Female | Dowa        | Mtondo     | 16 „               | D. 23 Feb.          |
|                  | 120 | Kikutha    | Boy    | „           | Kombeza    | „ „                | D. 2 May            |
|                  | 121 | Chalungiza | Male   | „           | Chikuni    | „ „                | D. 29 Mar.          |

| N <sup>o</sup> nth | No. | Name.         | Sex.   | District.    | Village.     | Date.            | Remarks.         |
|--------------------|-----|---------------|--------|--------------|--------------|------------------|------------------|
| Mar. = 5           | 122 | Msekankwazi   | Female | Dowa         | Chibungwe    | 1913<br>15 March | 1913<br>D. 4 May |
|                    | 123 | Mauangwisi    | "      | "            | Kombeza      | 17 "             | D. 13 "          |
|                    | 124 | Makho         | "      | "            | "            | " "              | D. 26 Mar.       |
|                    | 125 | Dluwalinyenza | Male   | "            | Gwende       | 18 "             | D. 22 "          |
|                    | 126 | Kamodzi       | Female | "            | Mgawachifu   | " "              | D. 15 July       |
| April = 2          | 127 | Mlima         | Male   | Dowa         | Lumwira      | 3 April          | D. 20 April      |
|                    | 128 | Maluza        | Female | "            | Mlesa        | " "              | D. 5 "           |
| May = 6            | 129 | Kwazizira     | Male   | Dowa         | mapidu       | 1 May            | D. 16 June       |
|                    | 130 | Yorauu        | Boy    | "            | Mtalimanja   | 5 "              | D. 1 Oct.        |
|                    | 131 | Chimwendo     | Female | "            | Juma         | 12 "             | D. 20 May        |
|                    | 132 | Kalunje       | Male   | "            | Mankwazi     | 19 "             | D. 28 "          |
|                    | 133 | Mekha         | Boy    | "            | Mtalimanja   | " "              |                  |
|                    | 134 | Dziwapo       | Female | "            | Kaya         | 31 "             | D. 14 June       |
| June = 3           | 135 | Chapalapata   | Male   | Dowa         | Chimpanga    | 3 June           | D. 20 July       |
|                    | 136 | Mpouda        | "      | "            | "            | " "              | D. 2 "           |
|                    | 137 | Manakumpara   | "      | "            | Kampidu      | 11 "             | D. 24 "          |
| July = 3           | 138 | Kamwendo      | Female | Dowa         | Mgawachifu   | 6 July           | D. 11 July       |
|                    | 139 | Msomani       | Male   | "            | Kuluunda     | 9 "              | D. 2 Nov.        |
|                    | 140 | Mkanthama     | "      | "            | Mwera        | 21 "             | D. 30 Aug.       |
| August = 13        | 141 | Thuknria      | Boy    | Dowa         | Mwalara      | 4 August         | D. 25 Sept.      |
|                    | 142 | Mwadiwani     | Female | (2) Marimba  | Chembe       | 5 "              | D. 5 Aug.        |
|                    | 143 | Mwanaisha     | "      | (3) "        | Katimbwiri   | 6 "              | D. "             |
|                    | 144 | Mtulana       | Infant | (4) "        | "            | " "              | D. "             |
|                    | 145 | Gwalanta      | Female | (5) "        | Msunga       | 7 "              | D. 8 "           |
|                    | 146 | Annie         | "      | (6) "        | Mvula        | 11 "             | D. "             |
|                    | 147 | Chiuta        | Male   | Dowa         | Muyanja      | 6 "              | D. 15 "          |
|                    | 148 | Sawadi        | "      | (1) S. Nyasa | Kasenga      | 15 "             |                  |
|                    | 149 | Pelakamoyo    | "      | (7) Marimba  | Chiboko      | 16 "             | D. "             |
|                    | 150 | Mdzozeni      | "      | (2) S. Nyasa | Storo        | 24 "             |                  |
|                    | 151 | Amidi         | Girl   | Dowa         | Mwakundi     | 23 "             | D. 24 "          |
|                    | 152 | Kamputhe      | "      | "            | Nzwada       | 31 "             | D. 10 Sept.      |
|                    | 153 | Kunyendula    | Boy    | (8) Marimba  | Mankwazi     | " "              | D. "             |
| Sept. = 6          | 154 | Manchichi     | Female | Dowa         | Kamkwazi     | 19 Sept.         | D. "             |
|                    | 155 | Maliro        | "      | (9) "        | Kabwabwa     | 24 "             | D. 1 Dec.        |
|                    | 156 | Jelemani      | Male   | "            | Chibungwe    | 29 "             | D. 21 Sept       |
|                    | 157 | Kanyaula      | "      | "            | Mtondo       | " "              | D. 2 Oct.        |
|                    | 158 | Amoni         | Youth  | (10, Marimba | Kandambo     | 28 "             |                  |
|                    | 159 | Kumyamato     | Female | (11), "      | Chipata      | 29 "             |                  |
| Oct. = 4           | 160 | Msambachomwe  | Girl   | Dowa         | Katawa       | 16 October       | D. 25 Oct.       |
|                    | 161 | Mperanjiru    | Male   | "            | Mankwazi     | 18 "             | D. 10 Nov.       |
|                    | 162 | Dongolosi     | "      | "            | Kampidu      | 23 "             | D. 14 Dec.       |
|                    | 163 | Adaui         | "      | (1) U. Shire | Mpimbi       | 30 "             |                  |
| Nov. = 4           | 164 | Kalembe       | Male   | Dowa         | Mlesi        | 1 Nov.           | D. 3 Nov.        |
|                    | 165 | Msongo        | Female | "            | Kampidu      | 5 "              | D. 6 "           |
|                    | 166 | Kwaweni       | Male   | "            | "            | 20 "             | D. 23 "          |
|                    | 167 | Jamu          | "      | "            | Fundichiliwa | 26 "             | D. 3 Dec.        |
| Dec. = 5           | 168 | Damba         | Male   | Dowa         | Msosa        | 10 Dec.          |                  |
|                    | 169 | Gundara       | "      | "            | Muyanja      | 11 "             | D. 11 Dec.       |
|                    | 170 | Mchele        | "      | (2) U. Shire | Galanje      | " "              |                  |
|                    | 171 | Timon         | "      | Dowa         | Chiuonjo     | 31 "             |                  |
|                    | 172 | Mwaranji      | "      | "            | Tasa         | " "              |                  |

A brief review of Sleeping Sickness Investigations which have been conducted during the year is presented under Section VI.

#### INFECTIOUS OR EPIDEMIC.

*Chicken-pox.*—Only six cases have been reported, as against 51 last year. Its seasonal prevalence may be said to synchronize with the commencement of the cold weather.

*Dysentery.*—283 cases of dysentery, as compared with 221 in the previous year, and 317 in the year preceding, came under treatment. Of these 283 cases, 74 were returned from Blantyre, 68 from Zomba, 54 from Chiromo, 30 from Karonga, 26 from Port Herald, and the remainder from other stations. The mortality was low, only three cases having died.

*Enteric.*—Four cases among Europeans, as against three last year; and two among natives, have been recorded during the year. Of the former, two occurred in Zomba and one of these, an official, died; one at Domasi, in the Zomba district; and one at Fort Johnston (an official) in the South Nyasa district. Both the native cases were reported from Zomba; one recovered and one died. It has not been possible to trace the source of infection in these cases, nor in the cases which came under notice last year, and they have accordingly been regarded as sporadic. Roberts, in his work on Enteric Fever in India, remarks: "The sporadic forms derive importance from the fact that they are taken by most observers to indicate without qualification infection from contact with the native environment, but some prime considerations are unremarked, if not overlooked in this connection. Among these are the probabilities of importation from another cantonment, the evolution of conditional parasites, the non-recognition of previous cases more or less typical, the hospitality to the virus afforded by apparently healthy individuals, the viability of the virus in the host and in external nature, and the possibility that infection acquired in the native surroundings may be derived from the men themselves." As to the relative incidence of enteric among European and Native Troops in India, he states that the ratio *per mille* of admissions during a combined period of 22 years was 17.0 among the former, and .2 among the latter. As regards Egypt, Sandwith observes that while enteric is very seldom absent from the European hospitals, it is a rare visitor to the wards of Egyptian hospitals. He has never met with a case in the autopsies performed by him, and others have recorded only one doubtful case in a total of 1,935 *post-mortems* on natives. Sandwith goes so far as to suggest that the native recruit "becomes liable to a slight amount of the disease while he is in contact with Europeans." Cantlie thus summarises his experience of enteric in Hong Kong: "Typhoid is rare among the Chinese. Chinese children are liable to typhoid, even more so than European children." And adult immunity among natives is accordingly attributed to child infection. But it is pointed out that if this were so we should expect to find a high incidence of enteric among children in the tropics, and Roberts states in this connection that "no single case of the disease was found among several hundred autopsies on children under 5 years of age who represented the poorest and most destitute stratum of the urban population of Cairo and Alexandria." I have dwelt on the subject at this length merely to emphasize the difficulties that must always attend any attempts to trace the source of infection in Europeans living among a native population in a tropical country. To account for the so-called sporadic cases one may presume, *in primis*, the existence of soil infection, from whatever source; and secondly, contamination of the water supply and infection of the susceptible.

*Gonorrhoea.*—Of the 62 cases, 16 were returned from Kota Kota, and 14 from Blantyre; the remainder were more or less evenly distributed among other stations.

*Leprosy.*—Twenty-six cases of nodular and three of anaesthetic came under the observation of Medical Officers; as many as fifteen having been reported from Kota Kota alone. At present there is no Leper Asylum; and, in view of the reported spread of leprosy in other countries, it becomes a question whether the segregation of lepers in this Protectorate should not be provided for as soon as funds permit. Chiefs and headmen of villages, it may be remarked, have

shown no inclination up to the present to take any action in the matter ; some tribes regard their lepers with repugnance, others with indifference, so that the healthy may be seen cohabiting with the leprous.

*Measles* furnished only nineteen cases during the year, and the disease may therefore be said to have prevailed with a diminished intensity. Cases among the rural population, however, escape attention ; and it is not improbable that when respiratory complications follow the infection may count as an appreciable factor in the death rate of children.

*Pneumonia*.—Of pneumonia there were 59 cases returned, as against 24 last year, and 74 in the year preceding. Kota Kota contributed 18 cases, Zomba 15, and Port Herald 12. As pointed out in previous reports pneumonia is one of the most important diseases affecting the general population, on account of the attendant mortality. It has recently been stated on good authority that, excepting the mines the disease is unknown among the natives of South Africa. Should this be the case, the circumstance is noteworthy ; and in view of the wide prevalence of pneumonia among the general population in this country, it is the more remarkable

*Small-pox*.—There were no admissions for small-pox during the year under review ; one case was reported by a missionary at the extreme southern portion of the Protectorate, the patient having brought the infection with him from the adjacent Portuguese territory. The existence of a non-protected population all round the Protectorate, between whom and our natives there is constant inter-communication, constitutes an ever-present danger which needs to be guarded against. Outbreaks of a localized character will occur from time to time, by the introduction of infection from without : it is hoped, however, that these sporadic outbreaks will, as in the past five years, admit of being speedily stamped out. The number of vaccinations which have been performed will be found tabulated under the head of preventive measures.

*Syphilis*.—Thirty-three cases of primary, ninety-one of secondary, and seven of inherited syphilis, making a total of 131 cases in all, have been returned this year. Of these, Zomba contributed 44, Fort Johnston 26, Port Herald 23, Kota Kota 14, Blantyre 9, Karonga 8, Mlanje 4, Chiromo 2, and Mangoche 1. I mention these returns in detail, in the event of any special action which may be contemplated later ; so that its place distribution, as noted in 1913, may remain on record.

*Tuberculosis*.—Thirty-two cases have been notified during the year, the larger proportion of these being localized in the Zomba, Marimba and Blantyre districts. It is questionable whether one would be justified in admitting these cases into hospitals with but one general ward ; the open air environment of their own scattered villages appearing to offer a more favourable opportunity for natural recovery. And it must always be borne in mind that a distinction is to be drawn between miner's phthisis, of which those returning from the South African mines are the subjects and tubercular invasion of the lungs ; an eminent authority having expressed the view that "tubercular infection in this disease (pneumokoniosis) is an accidental infection and not a necessary event." More especially must this distinction be observed when the scheme for the concentration of villages, under the District Administration Ordinance is being applied ; and the position of these people in relation thereto must receive careful consideration on the part of District Medical Officers, who, when assisting District Officers in the carrying out of this measure in their professional capacity, must eliminate all ill-considered, harassing restrictions.

*Yaws*.—In the course of their investigation work in other directions, Medical Officers have recorded twenty-five cases, and ten others have been returned as Dispensary cases, making a total of 35 for the year. While yaws is

everywhere occasionally met with, the Dedza district may be regarded as an important endemic centre. Some seven years ago a segregation hospital was erected at a central spot in this district for the treatment of cases ; the results were satisfactory, but the work could not be carried on indefinitely owing to the cost of the journeys to and back of the Medical Officer from the nearest station. Some observations on yaws made by Dr. Davey, in the course of his investigation of the Dedza district for cases of Sleeping Sickness, will be found in Section VI.

*Pellagra*.—Seventy-nine cases have been returned from the Central Prison at Zomba, and one from an out-station ; the disease may therefore be regarded as in the nature of an institutional epidemic. In a fairly recent issue of the British Medical Journal there appeared a summary of the views at present held as to the etiology of pellagra. These were expressed by Professor Perroncito of Pavia at the 8th meeting of the Italian Pathological Society, held in Pisa the various theories being grouped under three heads, namely :—(a). The zeistic theory which attributed Pellagra to poisoning by maize. Sound maize is stated by Zuntz to contain toxic substances which might give rise to Pellagra, experiments on animals showing that sound maize, to the exclusion of other food cannot keep them in health. In the case of man, however, several Italian workers have shown that although sound maize does contain toxic substances, their relation to pellagra has not yet been determined. Another theory, advanced by Aschoff and others, suggests that the fatty and colouring matters of maize render the tissues sensitive to light and thus give rise to the skin eruptions seen in patients. (b). The toxic-zeistic theory, supported by Lombroso, attributes the disease to an intoxication by poisons which develop in damaged maize, by the action of bacteria in themselves harmless to man, the injury to maize arising from its exposure to damp. It is to be noted in this connection that legislation which has been enforced in the pellagrous districts in Italy is based on this theory, as it has been held that there can be no doubt as to the toxicity of spoilt maize. (c). Of the parasitic theories which have been advanced, Ceni holds the view that pellagra is an infection with certain fungi which are said to form spores, and entering the various tissues produce toxins that cause pellagra. Tizzoni has described in detail a streptobacillus, which, circulating in the blood, produces toxins eventuating in pellagra. Sambon holds that there is no connection between pellagra and maize, and that probably *Simulium* is the carrier. Perroncito, while believing that Sambon's views may be correct, points out that from 90 to 99 per cent of the pellagrous feed mainly on maize, and that the disease unquestionably occurs in the absence of running water and in localities where *Simulium* is non-existent. Stannus, to whom credit is due for recognising the existence of the disease in the Zomba Central Prison, would regard it as an intoxication due to the ingestion of any damaged grain, though he considers the theory of infection being carried by *Simulium* as at any rate possible. What we have to consider is the position which obtains in Nyasaland, in reference to these inconsonant views as to the etiology of the disease. It may firstly be stated that maize is the staple diet of a large majority of the inhabitants of this country, and that knowing their habits it may safely be assumed that, occasionally, maize damaged by damp, is also consumed ; secondly, *Simulium* has a wide distribution throughout the country ; and thirdly, we have no evidence of the existence of pellagra, in endemic or epidemic form, in the Protectorate. The causative factor in the Central Prison here therefore appears to narrow down to two :—either a deficiency diet ; or a protozoal infection, whether conveyed by *cimex*, the body louse, or some other domestic insect. Dr. Stannus's further notes on the progress of the disease in the Central Prison will be found under Section VI.

#### HELMINTHIC.

An enquiry into the prevalence of Ankylostomiasis, and questions cognate thereto, has been conducted throughout the year in the North Nyasa district ; Dr. Eldred having been specially detailed for this duty. The results of his investigations are embodied in a paper which will be found under Section VI.

The prevalence of Ankylostomiasis, in some of the selected districts of the Protectorate, is shown in the subjoined Table.

| Period of investigation. | Name of District. | Number examined, | Number infected. | Per centum.  |
|--------------------------|-------------------|------------------|------------------|--------------|
| June to Dec. 1912        | North Nyasa ...   | 522              | 211              | 40.4         |
| August, 1912             | Zomba ...         | 493              | 109              | 22.1         |
| April, 1913              | South Nyasa ...   | 50               | 24               | 48.0         |
| Jan. to Dec. 1913        | North Nyasa ...   | 1,500            | 650              | 43.3         |
| January, 1913            | Ruo (River) ...   | 101              | 17               | 16.8         |
| May, 1913                | „ (Hills) ...     | 100              | 91               | 91.0         |
| Total                    |                   | 2,766            | 1,102            | 39.6<br>Mean |

Dr. Eldred has made careful observations on the general health of those infected with ankylostomes, as compared with the uninfected.

His results may be tabulated thus:—

| —                  | General Development. |             |              | Percentage of individuals showing one or more of the symptoms detailed below. |             |                    |             |                  |
|--------------------|----------------------|-------------|--------------|-------------------------------------------------------------------------------|-------------|--------------------|-------------|------------------|
|                    | Good                 | Fair        | Bad          | Circulatory                                                                   | Anaemia     | Gastro intestinal. | Joint pains | Pigmented tongue |
| No. examined 1,500 |                      |             |              |                                                                               |             |                    |             |                  |
| Infected ...       | Per cent 70          | Per cent 28 | Per cent 1.5 | Per cent 17                                                                   | Per cent 34 | Per cent 20        | Per cent 5  | Per cent 18      |
| Non-infected ...   | 68                   | 31          | 1.0          | 18                                                                            | 37          | 11                 | 6           | 17               |

In reference to double infection, with both ankylostomes and malaria, Dr. Eldred examined 275 children for the presence of ankylostome ova and enlarged spleen, regarding the latter as a criterion of malarial infection. Anaemia was present in 58% of children infected with ankylostomes, and in 62% of the uninfected.

Of those infected with ankylostomes:—

38% had both enlarged spleen and anaemia.

21% had enlarged spleen and no anaemia.

20% had no enlarged spleen and anaemia.

21% had neither enlarged spleen nor anaemia.

With regard to other symptoms caused by ankylostome infection in children, Dr. Eldred has presented the results of his investigations in the following Table.

| —                | General Development. |             |            | Percentage of children showing one or more of the symptoms detailed below. |                   |                                                |
|------------------|----------------------|-------------|------------|----------------------------------------------------------------------------|-------------------|------------------------------------------------|
|                  | Good                 | Fair        | Bad        | Circulatory                                                                | Gastro intestinal | Anaemia with or without enlargement of spleen. |
| No. examined 275 |                      |             |            |                                                                            |                   |                                                |
| Infected ...     | Per cent 64          | Per cent 32 | Per cent 4 | Per cent 8                                                                 | Per cent 28       | Per cent 58                                    |
| Non-infected ... | 66                   | 32          | 2          | 4                                                                          | 12                | 62                                             |

In view of the results embodied in the two preceding Tables, Dr. Eldred inclines to the opinion that a racial tolerance to the disease has been acquired, and he accordingly regards ankylostome infection as not materially affecting the healths or efficiency of the North Nyasa natives. In reference to children, he finds that the harbouring of ankylostomes cannot be said to cause arrested development, or to influence the death-rate in infants. His paper, in which are detailed the prophylactic and other measures which have been instituted in the North Nyasa district, will be found in the last Section of this Report. In this Section, also, is a paper on Helminthic Infections in the Ruu district, by Dr. Sanderson.

#### (B). EUROPEAN OFFICIALS.

The health of officials has in the main been satisfactory throughout the year, and there have been no invalidings. There was, however, one death from enteric, the proximate cause being intestinal haemorrhage. Owing to the now general adoption of quinine prophylaxis, an appreciable decline in the number of admissions for malarial fever is noticeable; and the sick registers show that minor ailments accounted for the major portion of the entries. An exception to this was the case of a member of the medical staff who contracted enteric at Fort Johnston in December, progress being so slow as not to admit of his discharge from hospital till February.

#### (C). GENERAL EUROPEAN POPULATION.

A reference to the health of this portion of the community can only be made in general terms, a large proportion of the sick being treated by mission doctors and therefore not coming under the notice of Medical Officers. Those admitted into Government hospitals, for the diseases specified, are shown in hospital returns, Table VI. In the out-patient practice there is nothing of interest to note. There were six deaths recorded by the medical staff; one in the Ruu district from malarial hyperpyrexia; three in the Blantyre Government Hospital, from cerebral embolism (after parturition), myocarditis, appendicitis complicated by abscess of the liver; and one in the Zomba Government Hospital, from septicaemia (oral sepsis).

#### (D). GENERAL NATIVE POPULATION.

The principal prevailing diseases among the general population have already been dealt with; vital statistics are not available to enable reference to be made to health conditions obtaining in the rural areas, with any degree of precision. No doubt, here as in other parts of Africa, there is a large mortality among infants and children, the chief causes being mismanagement at child-birth, grossly improper feeding, and to the contagious and infective maladies to which the young are liable. The causes of death among patients admitted to Government hospitals were as follows:—Pellagra 10 (Zomba Central Prison), injuries 4, dysentery and tuberculosis 3 each, pneumonia and syphilis 2 each, and one each from malaria, enteritis, enteric, anaemia, epilepsy, cirrhosis of liver, obstruction of bowels, rupture of uterus, and cellulitis.

TABLE SHOWING SICK, INVALIDING, AND DEATH RATES FOR EUROPEAN OFFICIALS, PORT HERALD.

|                                                         | 1911 | 1912 | 1913 |
|---------------------------------------------------------|------|------|------|
| Total number of Officials resident                      | 10   | 8    | 8    |
| Average number resident                                 | 10   | 5    | 5    |
| Total number on Sick List                               | 10   | 7    | 5    |
| Total number of days on Sick List                       | 30   | 36   | 32   |
| Average daily number on Sick List                       | .08  | .09  | .087 |
| Percentage of Sick to average number resident           | 100  | 140  | 100  |
| Average number of days on Sick List for each Patient    | 3    | 5.2  | 6.4  |
| Average Sick time to each resident                      | 3    | 7.2  | 4.0  |
| Total number Invalided                                  | Nil  | Nil  | Nil  |
| Percentage of Invalidings to total residents            | "    | "    | "    |
| Total Deaths                                            | "    | "    | "    |
| Percentage of Deaths to total residents                 | "    | "    | "    |
| " " " " average number resident                         | "    | "    | "    |
| No. of cases of Sickness contracted away from residence | "    | "    | "    |

TABLE SHOWING SICK, INVALIDING AND DEATH RATES FOR EUROPEAN OFFICIALS, BLANTYRE.

|                                                                | 1911 | 1912 | 1913 |
|----------------------------------------------------------------|------|------|------|
| Total number of Officials resident ... ..                      | 30   | 17   | 19   |
| Average number resident ... ..                                 | 10   | 11   | 12   |
| Total number on Sick List ... ..                               | 12   | 16   | 5    |
| Total number of days on Sick List ... ..                       | 100  | 46   | 26   |
| Average daily number on Sick List ... ..                       | .27  | .12  | .07  |
| Percentage of Sick to average number resident ... ..           | 120  | 145  | 41   |
| Average number of days on Sick List for each Patient ... ..    | 8.3  | 4.1  | 5.2  |
| Average Sick time to each resident ... ..                      | 3.3  | 3.83 | .73  |
| Total number Invalided ... ..                                  | Nil  | Nil  | Nil  |
| Percentage of Invalidings to total residents ... ..            | "    | "    | "    |
| Total Deaths ... ..                                            | "    | "    | "    |
| Percentage of Deaths to total resident ... ..                  | "    | "    | "    |
| " " " " , average number resident... ..                        | "    | "    | "    |
| No. of cases of Sickness contracted away from residence ... .. | "    | 6    | "    |

TABLE SHOWING SICK, INVALIDING, AND DEATH RATES FOR EUROPEAN OFFICIALS, ZOMBA.

|                                                                | 1911 | 1912 | 1913  |
|----------------------------------------------------------------|------|------|-------|
| Total number of Officials resident ... ..                      | 43   | 56   | 65    |
| Average number resident ... ..                                 | 40   | 44   | 51    |
| Total number on Sick List ... ..                               | 36   | 48   | 57    |
| Total number of days on Sick List ... ..                       | 311  | 646  | 724   |
| Average daily number on Sick List ... ..                       | .85  | 1.77 | 1.9   |
| Percentage of Sick to average number resident ... ..           | 99   | 109  | 111.7 |
| Average number of days on Sick List for each Patient ... ..    | 8.3  | 13.4 | 12.7  |
| Average Sick time to each resident ... ..                      | 7.2  | 14.7 | 11.1  |
| Total number Invalided ... ..                                  | 4    | 3    | —     |
| Percentage of Invalidings to total resident ... ..             | 10   | 5.3  | —     |
| Total Deaths ... ..                                            | Nil  | Nil  | 1     |
| Percentage of Deaths to total residents ... ..                 | "    | "    | 1.5   |
| " " " " , average number resident... ..                        | "    | "    | 1.9   |
| No. of cases of Sickness contracted away from residence ... .. | 6    | "    | —     |

TABLE SHOWING SICK, INVALIDING, AND DEATH RATES FOR EUROPEAN OFFICIALS, FORT JOHNSTON.

|                                                                | 1911 | 1912 | 1913 |
|----------------------------------------------------------------|------|------|------|
| Total number of Officials resident ... ..                      | 6    | 12   | 8    |
| Average number resident ... ..                                 | 6    | 8    | 6    |
| Total number on Sick List ... ..                               | 2    | 5    | 4    |
| Total number of days on Sick List ... ..                       | 9    | 91   | 10   |
| Average daily number on Sick List ... ..                       | 0.2  | .24  | .02  |
| Percentage of Sick to average number resident ... ..           | 33.3 | 41.6 | 66.6 |
| Average number of days on Sick List for each Patient ... ..    | 4.5  | 18.2 | 2.5  |
| Average Sick time to each resident ... ..                      | 3.3  | 7.58 | 1.2  |
| Total number Invalided ... ..                                  | Nil  | 1    | Nil  |
| Percentage of Invalidings to total residents ... ..            | "    | 8.3  | "    |
| Total Deaths ... ..                                            | "    | Nil  | "    |
| Percentage of Deaths to total residents ... ..                 | "    | "    | "    |
| " " " " , average number resident ... ..                       | "    | "    | "    |
| No. of cases of Sickness contracted away from residence ... .. | "    | 2    | "    |

### III.—SANITATION.

#### I.—ADMINISTRATIVE

The following Ordinances, Rules, Notices, &c., bearing on the public health, were passed during the year :—

1. The District Administration (Native) Ordinance, 1912. Section providing for the concentration of native huts, and generally for the better carrying into effect of the sanitary, administrative, and other purposes of the said Ordinance.

2. The Epidemic and Contagious Diseases Ordinance, 1913.

(a). Notice re Districts infected with Sleeping Sickness, applying thereto Rules 11, 12, 13, 14, 15, 16 and 26, under "The Sleeping Sickness Rules, 1913."

(b). Declaration of the Marimba, Dedza, South Nyasa and Upper Shire districts to be infected with Sleeping Sickness within the meaning of Rule 2 of "The Sleeping Sickness Rules, 1913."

3. The Townships Ordinance, 1912, Bye-laws made by Town Councils, under Section 20, for:—

(a). Port Herald Township.

(b). Blantyre „

(c). Zomba „

The Governor having very properly called attention to the necessity for a revision of the existing Sleeping Sickness Rules, which in their present form are difficult of application and in some respects somewhat obsolete, material for the drafting of new rules has been supplied. Incidentally, the question of framing rules for dealing more effectively with contagious and infectious diseases is also receiving attention.

## 2.—PREVENTIVE MEASURES.

### MOSQUITO AND INSECT-BORNE DISEASES.

*Malaria*.—The measures which have been detailed in previous reports continue to be applied, and comprise:—

(a). Personal prophylaxis; namely, screening, and the prophylactic use of quinine; (b). Petty anti-mosquito measures; prison labour, in the absence of special anti-malarial gangs, being largely used for this purpose; (c). The segregation of natives, as far as possible, in native locations.

Both surface and sub-soil drainage need attention. The existing open drains, more especially at the hill stations, require to be bricked and properly graded, if they are to discharge the work of carrying off storm water without leaving hollows along their course. The soil being in many places a stiff clay, these hollows and depressions hold water long enough to provide suitable breeding grounds for mosquitoes. Watson has shown how much can be achieved by sub-soil drainage, as an anti-malarial measure; and this is an undertaking to which the Agricultural Department may profitably devote some attention. At European settlements water-logging of the soil can be overcome by this means, and the breeding haunts of mosquitoes in such localities can therefore be destroyed.

*Spirochaetosis*.—Prisons which harbour ticks are dealt with weekly; in localities in which *O. moubata* has firmly established itself it has been found difficult to free the prisons absolutely of this pest for any length of time, owing no doubt to the frequent re-introduction of ticks by fresh arrivals.

*Trypanosomiasis*.—On my last tour of inspection of the Sleeping Sickness Area in the Dowa district the question of clearing, as a means of banishing tsetse flies from the immediate surroundings of native villages was carefully studied with a view to deciding whether these clearing operations could not with advantage be further extended.

It was evident that the clearings which had been commenced by Shircore, and thereafter continued by Conran, had resulted in a noticeable decrease of

flies from the neighbourhood of such villages as had been specially dealt with; and it was accordingly decided to continue this work on a more extended scale. Additional axes are now being provided with a view to commencing clearing operations early this year, along the main roads infested by fly.

The remaining prophylactic measures which have been instituted in the Sleeping Sickness Area may be summed up as follows:—

(a). Educating the natives as to the danger of exposing themselves to the bites of flies.

(b). Instructing them to refrain from visiting the adjacent fly-infested forests for firewood, and directing them to use the timber, which has already been felled, for domestic purposes.

(c). The installation of village latrines, to obviate the necessity of their going into the "bush" where tsetse flies abound.

(d). Removal, whenever feasible, of villages situated in danger zones to fly-free areas, with the approval and consent of headmen after the position has been carefully explained to them.

However much one may incline to the view that infection is mainly spread from man to man, it has not been considered advisable to enforce the segregation of infected natives. Such cases as are found are already few in number, and the majority of these are in a more or less advanced stage of the disease, and therefore incapacitated from travelling about and infecting flies. Segregation would inevitably result in the concealment of the infected, and the measure would not be justified unless some hope of a cure under treatment could be held out to them. In the absence of a remedy this is at present impracticable.

#### EPIDEMIC DISEASES.

*Small-pox.*—Appended is a return of the vaccinations which have been performed during the year. As the lymph received from the Lister Institute of Preventive Medicine suffices for about 6,000 vaccinations, the remainder are done by the arm-to-arm method. The percentage of successes obtained with the Lister Institute lanolinated lymph has been satisfactorily constant; test returns having yielded figures varying from 80 to 90 per cent of successful results. As to the reactions resulting from this imported lymph in persons who bear prominent marks of small-pox, Dr. Old observes that he has seen "the sores and oedema as well marked as one would expect in persons who had not had small-pox or been vaccinated before." This is an interesting point which has come under the notice of other Medical Officers also.

| District.          | Successful. | Modified. | Failed. | Not seen. | Total.  |
|--------------------|-------------|-----------|---------|-----------|---------|
| Lower Shire ... .. | 5,690       | 589       | 451     | 403       | 7,133   |
| Ruo ... ..         | 538         | 59        | 38      | —         | 635     |
| Mlanje ... ..      | 3,961       | 1,995     | 1,257   | 76        | 7,289   |
| Blantyre ... ..    | 31,919      | 7,557     | 3,438   | 474       | 43,388  |
| West Shire ... ..  | 226         | 36        | 50      | —         | 312     |
| Zomba ... ..       | 2,433       | 611       | 713     | 428       | 4,185   |
| Upper Shire ... .. | 4,221       | 588       | 561     | —         | 5,370   |
| South Nyasa ... .. | 11,360      | 791       | 3,302   | 391       | 15,844  |
| Dedza ... ..       | 1,188       | 872       | 908     | 977       | 3,954   |
| Lilongwe ... ..    | 15,470      | 5,522     | 4,046   | 3,935     | 28,973  |
| Dowa ... ..        | 1,838       | 954       | 336     | 40        | 3,168   |
| Marimba ... ..     | 3,270       | 2,566     | 868     | 72        | 6,776   |
| Mombera ... ..     | 9,012       | 1,355     | 1,208   | 360       | 11,935  |
| West Nyasa ... ..  | 2,037       | 804       | 907     | —         | 3,748   |
| North Nyasa ... .. | 234         | 353       | 135     | 79        | 801     |
|                    | 93,397      | 24,652    | 18,218  | 7,235     | 143,502 |

## HELMINTHIC DISEASES.

*Ankylostomiasis*.—The North Nyasa district has been selected for the purpose of applying both curative and prophylactic measures therein, and noting the results. Dr. Eldred was entrusted with this duty, and his paper which appears under Section VI shows what progress was made in this direction during the year 1913, and what difficulties had to be encountered. To attempt to eradicate the disease in a population which shows so high a rate of infection as 60 per cent is in itself a stupendous task, but it is hoped that the institution of village latrines, and the introduction of other sanitary reforms, will result in the improvement of health conditions generally among the rural population. Dr Eldred has now proceeded on leave, and the work is to be continued during his absence by Dr. Leys.

## 3.—GENERAL MEASURES.

It has been proposed to gradually introduce the system of conservancy, and the disposal of night soil and refuse, which, in the two previous reports, was recommended for the Zomba township. Public latrines for the native population are to be provided, and night soil is to be trenched, pending the question of the construction of an Incinerator.

The reports on sanitation which follow have been submitted by Medical Officers, in reference to their respective stations. .

*Port Herald*.—Dr Old, Medical Officer, Port Herald, reports as follows :—A new set of Rules for the township has been drawn up; these embodied some of my recommendations, and others were drafted by me.

There has been a good deal of opposition to the removal of natives from the township and their settlement in a native location. The site selected for this location will be divided into plots, and will be leased to occupiers by Government.

A small sanitary service was started for the Asiatic quarter where the latrines were very insanitary. A cylindrical, galvanized bucket, with lid and side handles, which was made to my order in Blantyre, was shown to them as a pattern. The Indian traders agreed to rent these from the Town Council; ten such buckets are now in use, one or two stores using a common latrine.

No steps have been taken by the Town Council in filling up borrow pits; it is to be hoped that this will be enforced. Some attention, but not enough, has been given to the collection and burial of cast-away, water-holding utensils in the township.

Three brick latrines were built by the Town Council for natives; each of these is divided into two compartments and has a sanitary bucket and cross sticks for a seat. The natives defaecate on the floor of the latrines, or on the box of earth, as often as into the bucket. A few who have been caught have been duly warned. Three latrines of similar construction have been built by the Resident for the use of prisoners and for the police lines.

*Mlanje*.—Dr. Davey, Medical Officer, Mlanje, states :—There being no township at Mlanje the various rules and orders in this connection do not apply.

The dry-earth system is in use at the Government station and the night soil is removed daily and buried near the edge of the station clearing. It would conduce to cleanliness in this matter were the latrines of officials' houses

provided with proper sanitary pails. These are things which officials who are subject to change of station can hardly be expected to provide for themselves, with the result that unsuitable substitutes are sometimes in use.

Household refuse is disposed of in a pit near the boundary of Government land.

It is in my opinion unfortunate that the native prison, police lines, and a collection of other native huts are situated in the middle of the Government clearing. They were doubtless placed in their present position when the Residency was the only house here; but now that there are always three officials living at the station, the first opportunity of removing them should be taken. A position below all the houses of the officials would be a suitable one.

A good water supply is afforded by the Namichira stream which bounds the Government clearing, and by drawing water above the Residency a pure water supply is practically assured.

*Blantyre.*—Dr. Barclay, the Medical Officer, Blantyre, reports :—During the year the Town Clerk who also acted as Inspector of Nuisances suddenly left, and another had to be appointed; this meant a lapse of sanitary work for a short period. A native Sanitary Inspector has been appointed and is doing excellent work.

The pail and cart system of disposal of sewage has acted well in the Asiatic quarter, and will be introduced in the European quarter.

The dust bins (municipal) were found to be insufficient in number and have been increased by ten. Building of brick drains has been going on steadily, as funds permit.

The water supply of Blantyre is still unsatisfactory, all wells being surface ones. If Government could purchase a boring plant and let it out to the Town Council and others it is believed pure water could be struck near Limbe and brought into the township. At present, with such a large native population, the danger of contamination of surface wells is self-evident.

*Zomba.*—Dr. Stannus, Medical Officer, Zomba, has submitted the following report :—Under the rigid system of inspection and prosecution for default that I have introduced during the last three years there has been a general improvement all round in the sanitary condition of the township.

Certain slight modifications will be introduced next year, but the general sanitary scheme which has been prepared will not be put into action.

Pail latrines, with incineration of night soil and refuse, will however be put into operation at the Camp shortly.

*Fort Johnston.*—Dr. Sanderson, Medical Officer, Fort Johnston, reports as follows :—There are more mosquitoes in the township than there should be, owing to the fact that the river has been allowed to become overgrown with weeds near the banks. This has been improved lately at the instance of Dr. Leys, but a good deal yet remains to be done.

I understand that the vote for “river improvements” has been abrogated; if this is so, a special vote will be necessary if Fort Johnston is to be maintained in a sanitary condition.

The river should be cleared for a distance of at least a mile in each direction, and should be kept clear; almost constant labour will be necessary to attain this.

The mosquito-proof rooms at the Medical Officer's house and at the European hospital are in a very bad state of repair, and new netting is required; such netting should be made of brass wire.

*Kota Kota*.—Dr. Morgan, Medical Officer, Kota Kota, reports that the clearance of bush and undergrowth has been carried out very extensively during the months of October and November at this station

Pails are used at houses occupied by Europeans. All night soil is emptied into pits over three feet deep, which are then filled in.

Native latrines have been built, but it is difficult to enforce their use.

Mosquitoes abound in Kota Kota; this is owing to the rice fields.

An excellent supply of water for domestic purposes is obtained from the hot springs situated about a mile and a half directly south of Kota Kota. All the European residents obtain their water from this source. One such spring has been carefully surrounded with a brick wall this year, thus preventing any contamination by flood water in the heavy rains.

The natives, however, obtain their supplies from enormous water holes, situated in the various villages comprising Kota Kota. Several have been closed in this year; to close all would entail great hardship on the very old people, as all water would then have to be carried from the hot springs. The water in the "Lagoon" is quite unsuitable for drinking purposes.

TABLE IV.

SUMMARY OF ROUTINE SANITARY WORK DONE DURING THE YEAR  
IN THE TOWN.

1. NAME OF TOWN. PORT HERALD.

| —             | Approximate<br>area. | Number of<br>proclaimed open<br>spaces. |
|---------------|----------------------|-----------------------------------------|
| 1911 .. .. .  | 200 acres            | None, but much<br>unoccupied land.      |
| 1912 ... .. . | "                    |                                         |
| 1913 ... .. . | "                    |                                         |

2. POPULATION.

| —             | Number of Natives. |          | Number of Europeans. |          | Total. |
|---------------|--------------------|----------|----------------------|----------|--------|
|               | Males.             | Females. | Males.               | Females. |        |
| 1911 ... .. . | 250                | 30       | 11                   | —        | 291    |
| 1912 ... .. . | 150                | 60       | 14                   | 2        | 226    |
| 1913 ... .. . | 277                | 127      | 12                   | 1        | 417    |

TABLE IV.—PORT HERALD—*continued.*

## 3. HOUSING.

|                    | Number occupied<br>by Europeans. | Number occupied<br>by Natives. |
|--------------------|----------------------------------|--------------------------------|
| Number of Houses:— |                                  |                                |
| 1911 ... ..        | 21                               | Nil                            |
| 1912 ... ..        | 25                               | "                              |
| 1913 ... ..        | 32                               | "                              |
| Number of Huts:—   |                                  |                                |
| 1911 ... ..        | Nil                              | 27                             |
| 1912 ... ..        | "                                | 49                             |
| 1913 ... ..        | "                                | 85                             |

## 4. MOSQUITO PROTECTION OF HOUSES.

|                                                                     | 1911 | 1912 | 1913 |
|---------------------------------------------------------------------|------|------|------|
| Number of European houses wholly mosquito-protected ...             | 2    | 3    | 4    |
| Number of European houses with mosquito room ... ..                 | 1    | 1    | 4    |
| Number rendered during the year wholly mosquito-protected           | —    | —    | —    |
| Number rendered during the year partially mosquito-protected ... .. | —    | —    | 10   |

## 5. ERECTION OF NEW BUILDINGS DURING THE YEAR.

|                                                                                                                   | 1911 | 1912 | 1913 |
|-------------------------------------------------------------------------------------------------------------------|------|------|------|
| Number of public buildings erected with sanction as to site, construction, and relation to other buildings ... .. | —    | 2    | 2    |
| Number of houses erected with sanction as to site, construction, and relation to other buildings ... ..           | 1    | 4    | 7    |
| Number of huts erected with sanction as to site, construction, and relation to other buildings ... ..             | —    | —    | 1    |
| Number of houses built without sanction ... ..                                                                    | —    | —    | —    |
| Number of huts built without sanction ... ..                                                                      | —    | —    | —    |

## ACTION TAKEN.

|             | Number of Prosecutions |         | Number demolished. |         |
|-------------|------------------------|---------|--------------------|---------|
|             | Huts.                  | Houses. | Huts.              | Houses. |
| 1911 ... .. | Nil                    | Nil     | Nil                | Nil     |
| 1912 ... .. | "                      | "       | "                  | "       |
| 1913 ... .. | "                      | "       | "                  | "       |

TABLE IV.—PORT HERALD—*continued*.

## 6. MARKETS.

|             | Total number. | Number paved<br>and drained. | Number unpaved. |
|-------------|---------------|------------------------------|-----------------|
| 1911 ... .. | Nil           | —                            | —               |
| 1912 ... .. | ”             | —                            | —               |
| 1913 ... .. | 2             | Nil                          | 2               |

## 7. SLAUGHTER-HOUSES.

|             | Total number. | Number paved<br>and drained. | Number unpaved. |
|-------------|---------------|------------------------------|-----------------|
| 1911 ... .. | Nil           | —                            | —               |
| 1912 ... .. | ”             | —                            | —               |
| 1913 ... .. | ”             | —                            | —               |

## 8. LATRINES.

|                                                             | For Males. |                     | For Females. |                     |
|-------------------------------------------------------------|------------|---------------------|--------------|---------------------|
|                                                             | Number.    | Number of<br>seats. | Number.      | Number of<br>seats. |
| Number of Public Latrines :—                                |            |                     |              |                     |
| 1911 .. ...                                                 | 3          | Trench              | 3            | Trench              |
| 1912 ... ..                                                 | 4          | —                   | 3            | —                   |
| 1913 ... ..                                                 | 5          | 5                   | 3            | 3                   |
| Number of new Public Latrines erected<br>during the year :— |            |                     |              |                     |
| 1911 ... ..                                                 | —          | —                   | —            | —                   |
| 1912 ... ..                                                 | 2          | Trench              | 2            | Trench              |
| 1913 ... ..                                                 | 5          | 5                   | 3            | 3                   |
| Number of Public Latrines repaired<br>during the year :—    |            |                     |              |                     |
| 1911 ... ..                                                 | —          | —                   | —            | —                   |
| 1912 ... ..                                                 | 2          | Trench              | 2            | Trench              |
| 1913 ... ..                                                 | 4          | ”                   | 3            | ”                   |
| Number of Public Latrines demolished<br>during the year :—  |            |                     |              |                     |
| 1911 ... ..                                                 | —          | —                   | —            | —                   |
| 1912 ... ..                                                 | 2          | Trench              | 2            | Trench              |
| 1913 ... ..                                                 | 4          | ”                   | 2            | ”                   |

|                                                                                 | 1911 | 1912 | 1913 |
|---------------------------------------------------------------------------------|------|------|------|
| Number of Private Latrines ... ..                                               | 28   | 37   | 35   |
| Average number of pails of nightsoil removed daily ...                          | —    | —    | 43   |
| Average number of soiled pails removed and clean pails<br>substituted ... ..    | Nil  | Nil  | Nil  |
| Number of nightsoil men employed to clean latrines and<br>remove excreta ... .. | —    | —    | 18   |
| Number of cesspools ... ..                                                      | Nil  | Nil  | Nil  |
| Number of cesspool cleansed ... ..                                              | ”    | ”    | ”    |
| Number of new cesspools constructed during the year ...                         | ”    | ”    | ”    |
| Number of old cesspools abolished ... ..                                        | ”    | ”    | ”    |
| Number of cesspools oiled regularly by Department ...                           | ”    | ”    | ”    |

TABLE IV.—PORT HERALD—*continued*.

## 9. REMOVAL OF REFUSE.

|                                                                           | 1911 | 1912 | 1913 |
|---------------------------------------------------------------------------|------|------|------|
| Number of dustbins ... ..                                                 | Nil  | Nil  | Nil  |
| Number of carts at work daily to remove refuse from streets               | —    | —    | —    |
| Amount of refuse removed daily ... ..                                     | —    | —    | —    |
| Number of carts at work daily to remove refuse from yards and premises... | —    | —    | —    |
| Amount of refuse removed daily from yards and premises ...                | —    | —    | —    |
| Number of men employed for moving refuse ... ..                           | —    | —    | 2    |

## 10 MODE OF DISPOSAL OF EXCRETA, REFUSE, AND OFFAL.

|                          | Daily average number of pails of excreta. |        |      | Daily average number of cartloads of refuse |      |      | Daily average number of cartloads of Slaughter House and Market Offal. |      |      |
|--------------------------|-------------------------------------------|--------|------|---------------------------------------------|------|------|------------------------------------------------------------------------|------|------|
|                          | 1911                                      | 1912   | 1913 | 1911                                        | 1912 | 1913 | 1911                                                                   | 1912 | 1913 |
| Buried or trenched ...   | buried                                    | buried |      | Nil                                         | Nil  | Nil  | Nil                                                                    | Nil  | Nil  |
| Burnt ...                | —                                         | —      | —    | ”                                           | ”    | ”    | ”                                                                      | ”    | ”    |
| Thrown into sea ...      | —                                         | —      | —    | ”                                           | ”    | ”    | ”                                                                      | ”    | ”    |
| Otherwise dealt with ... | —                                         | —      | —    | ”                                           | ”    | ”    | ”                                                                      | ”    | ”    |

State mode of disposal.

## 11. AVERAGE DAILY NUMBER OF CARTLOADS OF TIN CANS, BOTTLES, BROKEN CROCKERY, AND OTHER INCOMBUSTIBLE MATERIAL REMOVED FROM HOUSES, HUTS, AND COMPOUNDS.

| 1911      | 1912      | 1913      |
|-----------|-----------|-----------|
| No record | No record | No record |

## 12. WATER SUPPLY.

| Nature of Water Supply.                                                         | 1911 | 1912  | 1913 |
|---------------------------------------------------------------------------------|------|-------|------|
| Pipe-borne water :—                                                             |      |       |      |
| Source (river, lake, or spring) :—                                              |      | River |      |
| Number of linear yards ... ..                                                   | —    | —     | —    |
| Number of stand-pipes along roads ... ..                                        | —    | —     | —    |
| Number of stand-pipes in compounds and houses ...                               | —    | —     | —    |
| Wells :—                                                                        |      |       |      |
| Public :—                                                                       |      |       |      |
| Number ... ..                                                                   | Nil  | Nil   | Nil  |
| Number with pumps protected against surface water and mosquito-protected ... .. | —    | —     | —    |
| Private :—                                                                      |      |       |      |
| Number ... ..                                                                   | —    | 2     | 2    |
| Number protected against surface water and mosquito-protected ... ..            | —    | 2     | 2    |

TABLE IV.—PORT HERALD—*continued.*WATER SUPPLY—*continued.*

| Nature of Water Supply.                           | 1911 | 1912 | 1913 |
|---------------------------------------------------|------|------|------|
| Tanks :—                                          |      |      |      |
| Public :—                                         |      |      |      |
| Number underground ... ..                         | Nil  | Nil  | Nil  |
| Number mosquito-protected and served by pumps ... | —    | —    | —    |
| Number above ground ... ..                        | —    | —    | —    |
| Number mosquito-protected ... ..                  | —    | —    | —    |
| Number of 400 gallons capacity or less ... ..     | —    | —    | —    |
| Number above 400 gallons ... ..                   | —    | —    | —    |
| Private :—                                        |      |      |      |
| Number underground ... ..                         | Nil  | Nil  | Nil  |
| Number mosquito-protected ... ..                  | —    | —    | —    |
| Number above ground ... ..                        | —    | —    | —    |
| Number mosquito-protected ... ..                  | —    | —    | —    |
| Number of 400 gallons capacity or less ... ..     | —    | —    | —    |
| Number above 400 gallons ... ..                   | —    | —    | —    |
| Nature of tanks :—                                |      |      |      |
| Wood ... ..                                       | Nil  | Nil  | Nil  |
| Iron ... ..                                       | —    | —    | —    |
| Concrete ... ..                                   | —    | —    | —    |
| Barrels :—                                        |      |      |      |
| Number ... ..                                     | —    | 7    | 7    |
| Number mosquito-protected ... ..                  | —    | Nil  | Nil  |

## 13. DRAINAGE.

| Nature of Drainage.                                       | Public. | Private. |
|-----------------------------------------------------------|---------|----------|
| Masonry drains :—                                         |         |          |
| Lineal yards of masonry drains :—                         |         |          |
| 1911 ... ..                                               | —       | —        |
| 1912 ... ..                                               | 35      | Nil      |
| 1913 ... ..                                               | 35      | —        |
| Lineal yards reconstructed during the year :—             |         |          |
| 1911 ... ..                                               | —       | —        |
| 1912 ... ..                                               | Nil     | —        |
| 1913 ... ..                                               | ”       | —        |
| Lineal yards repaired during the year :—                  |         |          |
| 1911 ... ..                                               | —       | —        |
| 1912 ... ..                                               | Nil     | Nil      |
| 1913 ... ..                                               | ”       | ”        |
| Lineal yards of new drains constructed during the year :— |         |          |
| 1911 ... ..                                               | —       | —        |
| 1912 ... ..                                               | Nil     | Nil      |
| 1913 ... ..                                               | ”       | ”        |
| Earth drains or ditches :—                                |         |          |
| Number of linear yards of ditches cleaned :—              |         |          |
| 1911 ... ..                                               | —       | Nil      |
| 1912 ... ..                                               | —       | ”        |
| 1913 ... ..                                               | 555     | ”        |
| Number of linear yards of ditches dug and graded :—       |         |          |
| 1911 ... ..                                               | —       | Nil      |
| 1912 ... ..                                               | —       | —        |
| 1913 ... ..                                               | 555     | —        |
| Average frequency of clearing ditches of grass :—         |         |          |
| 1911 ... ..                                               | —       | —        |
| 1912 ... ..                                               | Twice a | year.    |
| 1913 ... ..                                               | ”       | ”        |

TABLE IV.—PORT HERALD—*continued*.

## 14. CLEARANCE OF UNDERGROWTH, LONG GRASS, AND JUNGLE.

|                                                                               | 1911 | 1912 | 1913             |
|-------------------------------------------------------------------------------|------|------|------------------|
| Number of square yards of weeds, grass, and vegetation cut and removed ... .. | —    | —    | 225              |
| Average frequency of clearance of rank vegetation on same area .. .. .        | —    | —    | acres.<br>Twice. |

## 15. EXCAVATION AND LOW-LYING LAND.

|                                                                                    | 1911 | 1912 | 1913 |
|------------------------------------------------------------------------------------|------|------|------|
| Number of pools and excavations ... ..                                             | Nil  | Nil  | Nil  |
| Number of excavations filled up ... ..                                             | —    | —    | —    |
| Amount of low-lying and marsh land raised and drained ...                          | —    | —    | —    |
| Number of pools, marshes, streams, &c., fish-stocked ...                           | —    | —    | —    |
| Number of cubic yards of material used for filling up pools and excavations ... .. | —    | —    | —    |
| Number of persons fined for making new excavations ...                             | —    | —    | —    |
| Average number of men daily employed in filling up pools &c. ... ..                | —    | —    | —    |

## 16. OILING.

|                                                                                                 | 1911 | 1912 | 1913 |
|-------------------------------------------------------------------------------------------------|------|------|------|
| Number of drains oiled ... ..                                                                   | Nil  | Nil  | Nil  |
| Number of pools and excavations oiled ... ..                                                    | —    | —    | —    |
| Number of tanks and barrels oiled ... ..                                                        | —    | —    | —    |
| Average number of men daily employed for oiling drains, pools, and watertanks or barrels ... .. | —    | —    | —    |

## 17. INSPECTIONS AND PROSECUTIONS.

|                                                                                     | 1911 | 1912 | 1913 |
|-------------------------------------------------------------------------------------|------|------|------|
| Number of inspectors employed ... ..                                                | —    | —    | 1    |
| Number of houses inspected ... ..                                                   | —    | All  | All  |
| Number of houses where larvae were found ... ..                                     | —    | Nil  | 10   |
| Number of notices served to remove conditions causing the breeding of larvae ... .. | —    | ”    | 6    |
| Number of persons fined for having mosquito larvae on premises ... ..               | —    | ”    | 4    |
| Number of notices served to remove insanitary conditions on premises ... ..         | —    | ”    | 5    |
| Number of persons fined for not removing insanitary conditions after notice ... ..  | —    | ”    | Nil  |
| Number of soda and aerated water factories inspected ...                            | Nil  | ”    | ”    |

TABLE IV.—*continued.*SUMMARY OF ROUTINE SANITARY WORK DONE DURING THE YEAR  
IN THE TOWN.

## 1. NAME OF TOWN.—BLANTYRE.

| —    |     |     |     | Approximate<br>area. | Number of<br>proclaimed open<br>spaces. |
|------|-----|-----|-----|----------------------|-----------------------------------------|
| 1911 | ... | ... | ... | 1,685 acres          | Boma Square.                            |
| 1912 | ... | ... | ... | ”                    | Sports Grounds.                         |
| 1913 | ... | ... | ... | ”                    | Golf Links.                             |

## 2. POPULATION.

| —    |     |     |     | Number of Natives. |          | Number of Europeans. |          | Total. |
|------|-----|-----|-----|--------------------|----------|----------------------|----------|--------|
|      |     |     |     | Males.             | Females. | Males.               | Females. |        |
| 1911 | ... | ... | ... | 786                | 114      | 51                   | 16       | 967    |
| 1912 | ... | ... | ... | 853                | 175      | 54                   | 19       | 1,101  |
| 1913 | ... | ... | ... | 987                | 232      | 59                   | 17       | 1,295  |

## 3. HOUSING.

| —                   |     |     |     | Number occupied<br>by Europeans. | Number occupied<br>by Natives. |
|---------------------|-----|-----|-----|----------------------------------|--------------------------------|
| Number of Houses :— |     |     |     |                                  |                                |
| 1911                | ... | ... | ... | 26                               | Nil                            |
| 1912                | ... | ... | ... | 30                               | ”                              |
| 1913                | ... | ... | ... | 35                               | ”                              |
| Number of Huts :—   |     |     |     |                                  |                                |
| 1911                | ... | ... | ... | Nil                              | No record                      |
| 1912                | ... | ... | ... | ”                                | ”                              |
| 1913                | ... | ... | ... | ”                                | ”                              |

## 4. MOSQUITO PROTECTION OF HOUSES.

| —                                                            |  |  |  | 1911 | 1912 | 1913 |
|--------------------------------------------------------------|--|--|--|------|------|------|
| Number of European houses wholly mosquito-protected          |  |  |  | 1    | 1    | 1    |
| Number of European houses with mosquito room                 |  |  |  | —    | —    | —    |
| Number rendered during the year wholly mosquito-protected    |  |  |  | —    | —    | 1    |
| Number rendered during the year partially mosquito-protected |  |  |  | —    | —    | —    |

TABLE IV.—BLANTYRE—continued.

5. ERECTION OF NEW BUILDINGS DURING THE YEAR.

|                                                                                                                   | 1911 | 1912 | 1913 |
|-------------------------------------------------------------------------------------------------------------------|------|------|------|
| Number of public buildings erected with sanction as to site, construction, and relation to other buildings ... .. | 2    | 1    | —    |
| Number of houses erected with sanction as to site, construction, and relation to other buildings ... ..           | —    | 4    | 1    |
| Number of huts erected with sanction as to site, construction, and relation to other buildings ... ..             | —    | —    | —    |
| Number of houses built without sanction ... ..                                                                    | —    | —    | 1    |
| Number of huts built without sanction ... ..                                                                      | —    | —    | —    |

ACTION TAKEN.

|      |     |     |     |     |     |     | Number of Prosecutions |         | Number demolished. |         |
|------|-----|-----|-----|-----|-----|-----|------------------------|---------|--------------------|---------|
|      |     |     |     |     |     |     | Huts.                  | Houses. | Huts.              | Houses. |
| 1911 | ... | ... | ... | ... | ... | ..  | Nil                    | Nil     | No record          | Nil     |
| 1912 | ... | ... | ... | ... | ... | ..  | "                      | "       | "                  | "       |
| 1913 | ... | ... | ... | ... | ... | ... | "                      | "       | "                  | "       |

6. MARKETS.

|      |     |     |     |     | Total number. | Number paved and drained. | Number unpaved. |
|------|-----|-----|-----|-----|---------------|---------------------------|-----------------|
| 1911 | ... | ... | ... | ... | 1             | Nil                       | 1               |
| 1912 | ... | ... | ... | ... | 1             | "                         | 1               |
| 1913 | ... | ... | ... | ... | 1             | "                         | 1               |

7. SLAUGHTER-HOUSES.

|      |     |     |     |     | Total number. | Number paved and drained. | Number unpaved. |
|------|-----|-----|-----|-----|---------------|---------------------------|-----------------|
| 1911 | ... | ... | ... | ... | 1             | Nil                       | 1               |
| 1912 | ... | ... | ... | ... | 1             | "                         | 1               |
| 1913 | ... | ... | ... | ..  | 1             | "                         | 1               |

TABLE IV.—BLANTYRE—*continued*.

## 8. LATRINES.

|                                                          | For Males. |                  | For Females. |                  |
|----------------------------------------------------------|------------|------------------|--------------|------------------|
|                                                          | Number.    | Number of seats. | Number.      | Number of seats. |
| Number of Public Latrines :—                             |            |                  |              |                  |
| 1911 .. .. .                                             | 1          | —                | 1            | —                |
| 1912 .. .. .                                             | 3          | —                | 3            | —                |
| 1913 .. .. .                                             | 4          | —                | 4            | —                |
| Number of new Public Latrines erected during the year :— |            |                  |              |                  |
| 1911 .. .. .                                             | —          | —                | —            | —                |
| 1912 .. .. .                                             | 2          | —                | 2            | —                |
| 1913 .. .. .                                             | 1          | —                | 1            | —                |
| Number of Public Latrines repaired during the year :—    |            |                  |              |                  |
| 1911 .. .. .                                             | —          | —                | —            | —                |
| 1912 .. .. .                                             | —          | —                | —            | —                |
| 1913 .. .. .                                             | —          | —                | —            | —                |
| Number of Public Latrines demolished during the year :—  |            |                  |              |                  |
| 1911 .. .. .                                             | —          | —                | —            | —                |
| 1912 .. .. .                                             | 2          | —                | 2            | —                |
| 1913 .. .. .                                             | —          | —                | —            | —                |

|                                                                               | 1911 | 1912 | 1913 |
|-------------------------------------------------------------------------------|------|------|------|
| Number of Private Latrines .. .. .                                            | 22   | 26   | 26   |
| Average number of pails of nightsoil removed daily .. .. .                    | "    | "    | "    |
| Average number of soiled pails removed and clean pails substituted .. .. .    | —    | —    | —    |
| Number of nightsoil men employed to clean latrines and remove excreta .. .. . | 22   | 26   | 26   |
| Number of cesspools .. .. .                                                   | Nil  | Nil  | Nil  |
| Number of cesspool cleansed .. .. .                                           | "    | "    | "    |
| Number of new cesspools constructed during the year .. .. .                   | "    | "    | "    |
| Number of old cesspools abolished .. .. .                                     | "    | "    | "    |
| Number of cesspools oiled regularly by Department .. .. .                     | "    | "    | "    |

## 9. REMOVAL OF REFUSE.

|                                                                                | 1911 | 1912 | 1913 |
|--------------------------------------------------------------------------------|------|------|------|
| Number of dustbins .. .. .                                                     | Nil  | Nil  | 6    |
| Number of carts at work daily to remove refuse from streets .. .. .            | —    | —    | 1    |
| Amount of refuse removed daily .. .. .                                         | —    | —    | —    |
| Number of carts at work daily to remove refuse from yards and premises .. .. . | —    | —    | 1    |
| Amount of refuse removed daily from yards and premises .. .. .                 | —    | —    | —    |
| Number of men employed for moving refuse .. .. .                               | —    | —    | 3    |

TABLE IV.—BLANTYRE—continued.

10 MODE OF DISPOSAL OF EXCRETA, REFUSE, AND OFFAL.

|                          | Daily average number of pails of excreta. |        |      | Daily average number of cartloads of refuse |       |      | Daily average number of cartloads of Slaughter House and Market Offal. |      |      |
|--------------------------|-------------------------------------------|--------|------|---------------------------------------------|-------|------|------------------------------------------------------------------------|------|------|
|                          | 1911                                      | 1912   | 1913 | 1911                                        | 1912  | 1913 | 1911                                                                   | 1912 | 1913 |
| Buried or trenched ...   | Buried                                    | Buried |      | —                                           | —     | —    | Nil                                                                    | Nil  | Nil  |
| Burnt ...                | —                                         | —      | —    | Burnt                                       | Burnt |      | "                                                                      | "    | "    |
| Thrown into sea ...      | —                                         | —      | —    | —                                           | —     | —    | "                                                                      | "    | "    |
| Otherwise dealt with ... | —                                         | —      | —    | —                                           | —     | —    | "                                                                      | "    | "    |

State mode of disposal.

11. AVERAGE DAILY NUMBER OF CARTLOADS OF TIN CANS, BOTTLES, BROKEN CROCKERY, AND OTHER INCOMBUSTIBLE MATERIAL REMOVED FROM HOUSES, HUTS, AND COMPOUNDS.

| 1911      | 1912      | 1913      |
|-----------|-----------|-----------|
| No record | No record | No record |

12. WATER SUPPLY.

| Nature of Water Supply.                                                      | 1911 | 1912 | 1913 |
|------------------------------------------------------------------------------|------|------|------|
| Pipe-borne water :—                                                          |      |      |      |
| Source (river, lake, or spring) :—                                           |      |      |      |
| Number of linear yards ...                                                   | —    | —    | —    |
| Number of stand-pipes along roads ...                                        | —    | —    | —    |
| Number of stand-pipes in compounds and houses ...                            | —    | —    | —    |
| Wells :—                                                                     |      |      |      |
| Public :—                                                                    |      |      |      |
| Number ...                                                                   | 1    | 1    | 2    |
| Number with pumps protected against surface water and mosquito-protected ... | —    | —    | —    |
| Private :—                                                                   |      |      |      |
| Number ...                                                                   | 2    | 2    | 3    |
| Number protected against surface water and mosquito-protected ...            | —    | —    | —    |
| Tanks :—                                                                     |      |      |      |
| Public :—                                                                    |      |      |      |
| Number underground ...                                                       | —    | —    | —    |
| Number mosquito-protected and served by pumps ...                            | —    | —    | —    |
| Number above ground ...                                                      | —    | —    | —    |
| Number mosquito-protected ...                                                | —    | —    | —    |
| Number of 400 gallons capacity or less ...                                   | —    | —    | —    |
| Number above 400 gallons ...                                                 | —    | —    | —    |
| Private :—                                                                   |      |      |      |
| Number underground ...                                                       | —    | —    | —    |
| Number mosquito-protected ...                                                | —    | —    | —    |
| Number above ground ...                                                      | —    | —    | 5    |
| Number mosquito-protected ...                                                | —    | —    | —    |
| Number of 400 gallons capacity or less ...                                   | —    | —    | —    |
| Number above 400 gallons ..                                                  | —    | —    | —    |

TABLE IV.—BLANTYRE—*continued*.WATER SUPPLY—*continued*.

| Nature of Water Supply.          | 1911 | 1912 | 1913 |
|----------------------------------|------|------|------|
| Nature of tanks:—                |      |      |      |
| Wood ... ..                      | —    | —    | —    |
| Iron ... ..                      | —    | —    | 5    |
| Concrete ... ..                  | —    | —    | —    |
| Barrels:—                        |      |      |      |
| Number ... ..                    | —    | —    | —    |
| Number mosquito-protected ... .. | —    | —    | —    |

## 13. DRAINAGE.

| Nature of Drainage.                                      | Public.                 | Private.          |
|----------------------------------------------------------|-------------------------|-------------------|
| Masonry drains:—                                         |                         |                   |
| Lineal yards of masonry drains:—                         |                         |                   |
| 1911 ... ..                                              | } A few roads drains on | with brick sides. |
| 1912 ... ..                                              |                         |                   |
| 1913 ... ..                                              |                         |                   |
| Lineal yards reconstructed during the year:—             |                         |                   |
| 1911 ... ..                                              | —                       | —                 |
| 1912 ... ..                                              | —                       | —                 |
| 1913 ... ..                                              | —                       | —                 |
| Lineal yards repaired during the year:—                  |                         |                   |
| 1911 ... ..                                              | —                       | —                 |
| 1912 ... ..                                              | —                       | —                 |
| 1913 ... ..                                              | —                       | —                 |
| Lineal yards of new drains constructed during the year:— |                         |                   |
| 1911 ... ..                                              | —                       | —                 |
| 1912 ... ..                                              | —                       | —                 |
| 1913 ... ..                                              | —                       | —                 |
| Earth drains or ditches:—                                |                         |                   |
| Number of linear yards of ditches cleaned:—              |                         |                   |
| 1911 ... ..                                              | } Roadside drained.     | borrow pits       |
| 1912 ... ..                                              |                         |                   |
| 1913 ... ..                                              |                         |                   |
| Number of linear yards of ditches dug and graded:—       |                         |                   |
| 1911 ... ..                                              | —                       | —                 |
| 1912 ... ..                                              | —                       | —                 |
| 1913 ... ..                                              | —                       | —                 |
| Average frequency of clearing ditches of grass:—         |                         |                   |
| 1911 ... ..                                              | Periodically.           |                   |
| 1912 ... ..                                              | ”                       |                   |
| 1913 ... ..                                              | ”                       |                   |

## 14. CLEARANCE OF UNDERGROWTH, LONG GRASS, AND JUNGLE.

|                                                                               | 1911          | 1912 | 1913 |
|-------------------------------------------------------------------------------|---------------|------|------|
| Number of square yards of weeds, grass, and vegetation cut and removed ... .. | No record.    |      |      |
| Average frequency of clearance of rank vegetation on same area ... ..         | Periodically. |      |      |

TABLE IV.—BLANTYRE—*continued*.

## 15. EXCAVATION AND LOW-LYING LAND.

|                                                                             | 1911 | 1912 | 1913 |
|-----------------------------------------------------------------------------|------|------|------|
| Number of pools and excavations                                             | Nil  | Nil  | Nil  |
| Number of excavations filled up                                             | —    | —    | —    |
| Amount of low-lying and marsh land raised and drained                       | —    | —    | —    |
| Number of pools, marshes, streams, &c., fish-stocked                        | —    | —    | —    |
| Number of cubic yards of material used for filling up pools and excavations | —    | —    | —    |
| Number of persons fined for making new excavations                          | —    | —    | —    |
| Average number of men daily employed in filling up pools &c.                | —    | —    | —    |

## 16. OILING.

|                                                                                          | 1911 | 1912 | 1913 |
|------------------------------------------------------------------------------------------|------|------|------|
| Number of drains oiled                                                                   | Nil  | Nil  | Nil  |
| Number of pools and excavations oiled                                                    | —    | —    | —    |
| Number of tanks and barrels oiled                                                        | —    | —    | —    |
| Average number of men daily employed for oiling drains, pools, and watertanks or barrels | —    | —    | —    |

## 17. INSPECTIONS AND PROSECUTIONS.

|                                                                              | 1911                 | 1912 | 1913 |
|------------------------------------------------------------------------------|----------------------|------|------|
| Number of inspectors employed                                                | M. O. H. inspectors. |      |      |
| Number of houses inspected                                                   | —                    | —    | —    |
| Number of houses where larvae were found                                     | —                    | 2    | 1    |
| Number of notices served to remove conditions causing the breeding of larvae | —                    | 2    | 1    |
| Number of persons fined for having mosquito larvae on premises               | —                    | —    | —    |
| Number of notices served to remove insanitary conditions on premises         | —                    | 14   | 30   |
| Number of persons fined for not removing insanitary conditions after notice  | 1                    | 6    | 7    |
| Number of soda and aerated water factories inspected                         | —                    | 2    | 2    |

TABLE IV.—*continued.*SUMMARY OF ROUTINE SANITARY WORK DONE DURING THE YEAR  
IN THE TOWN.

## 1. NAME OF TOWN.—ZOMBA.

| —    |     |     |     | Approximate<br>area. | Number of<br>proclaimed open<br>spaces. |
|------|-----|-----|-----|----------------------|-----------------------------------------|
| 1911 | ... | ... | ... | 668 acres            | Golf Links.                             |
| 1912 | ... | ... | ... | "                    | Sports Grounds.                         |
| 1913 | ... | ... | ... | "                    | Botanical<br>Gardens.                   |

## 2. POPULATION.

| —    |     |     |     | Number of Natives. |          | Number of Europeans. |          | Total. |
|------|-----|-----|-----|--------------------|----------|----------------------|----------|--------|
|      |     |     |     | Males.             | Females. | Males.               | Females. |        |
| 1911 | ... | ... | ... | 237                | 84       | 57                   | 29       | 407    |
| 1912 | ... | ... | ... | 540                | 225      | 61                   | 29       | 855    |
| 1913 | ... | ... | ... | 841                | 279      | 59                   | 25       | 1,204  |

## 3. HOUSING.

| —                  |     |     |     | Number occupied<br>by Europeans. | Number occupied<br>by Natives. |
|--------------------|-----|-----|-----|----------------------------------|--------------------------------|
| Number of Houses:— |     |     |     |                                  |                                |
| 1911               | ... | ... | ... | 55                               | Nil                            |
| 1912               | ... | ... | ... | 55                               | "                              |
| 1913               | ... | ... | ... | 56                               | "                              |
| Number of Huts:—   |     |     |     |                                  |                                |
| 1911               | ... | ... | ... | Nil                              | 292                            |
| 1912               | ... | ... | ... | "                                | 585                            |
| 1913               | ... | ... | ... | "                                | 600                            |

## 4. MOSQUITO PROTECTION OF HOUSES.

| —                                                            |  |  |  | 1911 | 1912 | 1913 |
|--------------------------------------------------------------|--|--|--|------|------|------|
| Number of European houses wholly mosquito-protected          |  |  |  | Nil  | Nil  | Nil  |
| Number of European houses with mosquito room                 |  |  |  | "    | "    | "    |
| Number rendered during the year wholly mosquito-protected    |  |  |  | "    | "    | "    |
| Number rendered during the year partially mosquito-protected |  |  |  | "    | "    | "    |

TABLE IV.—ZOMBA—*continued*.

## 5. ERECTION OF NEW BUILDINGS DURING THE YEAR.

|                                                                                                                   | 1911 | 1912 | 1913 |
|-------------------------------------------------------------------------------------------------------------------|------|------|------|
| Number of public buildings erected with sanction as to site, construction, and relation to other buildings ... .. | Nil  | Nil  | Nil  |
| Number of houses erected with sanction as to site, construction, and relation to other buildings ... ..           | "    | 1    | 1    |
| Number of huts erected with sanction as to site, construction, and relation to other buildings ... ..             | "    | Nil  | Nil  |
| Number of houses built without sanction ... ..                                                                    | "    | 1    | —    |
| Number of huts built without sanction ... ..                                                                      | "    | 20   | —    |

## ACTION TAKEN.

|             | Number of Prosecutions |         | Number demolished. |         |
|-------------|------------------------|---------|--------------------|---------|
|             | Huts.                  | Houses. | Huts.              | Houses. |
| 1911 ... .. | Nil                    | Nil     | Nil                | Nil     |
| 1912 ... .. | 20                     | 1       | 20                 | "       |
| 1913 ... .. | —                      | —       | —                  | "       |

## 6. MARKETS.

|             | Total number. | Number paved and drained. | Number unpaved. |
|-------------|---------------|---------------------------|-----------------|
| 1911 ... .. | 1             | Nil                       | 1               |
| 1912 ... .. | 1             | "                         | 1               |
| 1913 ... .. | 1             | "                         | 1               |

## 7. SLAUGHTER-HOUSES.

|             | Total number. | Number paved and drained. | Number unpaved. |
|-------------|---------------|---------------------------|-----------------|
| 1911 ... .. | Nil           | —                         | —               |
| 1912 ... .. | "             | —                         | —               |
| 1913 ... .. | "             | —                         | —               |

TABLE IV.—ZOMBA—*continued*.

## 8. LATRINES.

|                                                         | For Males. |                  | For Females. |                  |
|---------------------------------------------------------|------------|------------------|--------------|------------------|
|                                                         | Number.    | Number of seats. | Number.      | Number of seats. |
| Number of Public Latrines:—                             |            |                  |              |                  |
| 1911 .. .. .                                            | 1          | 3                | 1            | —                |
| 1912 .. .. .                                            | 5          | Trench           | 5            | Trench           |
| 1913 .. .. .                                            | 3          | 3                | —            | ”                |
| 1913 .. .. .                                            | ”          | ”                | 5            | ”                |
| Number of new Public Latrines erected during the year:— |            |                  |              |                  |
| 1911 .. .. .                                            | Nil        | —                | Nil          | —                |
| 1912 .. .. .                                            | ”          | —                | ”            | —                |
| 1913 .. .. .                                            | ”          | —                | ”            | —                |
| Number of Public Latrines repaired during the year:—    |            |                  |              |                  |
| 1911 .. .. .                                            | Nil        | —                | Nil          | —                |
| 1912 .. .. .                                            | 5          | Trench           | 5            | Trench           |
| 1913 .. .. .                                            | ”          | ”                | ”            | ”                |
| Number of Public Latrines demolished during the year:—  |            |                  |              |                  |
| 1911 .. .. .                                            | Nil        | —                | Nil          | —                |
| 1912 .. .. .                                            | ”          | —                | ”            | —                |
| 1913 .. .. .                                            | ”          | —                | ”            | —                |

|                                                                               | 1911               | 1912 | 1913 |
|-------------------------------------------------------------------------------|--------------------|------|------|
| Number of Private Latrines .. .. .                                            | 55                 | 55   | 56   |
| Average number of pails of nightsoil removed daily .. .. .                    | ”                  | ”    | ”    |
| Average number of soiled pails removed and clean pails substituted .. .. .    | —                  | —    | —    |
| Number of nightsoil men employed to clean latrines and remove excreta .. .. . | One to each house. |      |      |
| Number of cesspools .. .. .                                                   | —                  | —    | —    |
| Number of cesspools cleansed .. .. .                                          | —                  | —    | —    |
| Number of new cesspools constructed during the year .. .. .                   | —                  | —    | —    |
| Number of old cesspools abolished .. .. .                                     | —                  | —    | —    |
| Number of cesspools oiled regularly by Department .. .. .                     | —                  | —    | —    |

## 9. REMOVAL OF REFUSE.

|                                                                                | 1911      | 1912 | 1913 |
|--------------------------------------------------------------------------------|-----------|------|------|
| Number of dustbins .. .. .                                                     | Nil       | Nil  | 12   |
| Number of carts at work daily to remove refuse from streets .. .. .            | —         | —    | —    |
| Amount of refuse removed daily .. .. .                                         | —         | —    | —    |
| Number of carts at work daily to remove refuse from yards and premises... .. . | —         | —    | —    |
| Amount of refuse removed daily from yards and premises .. .. .                 | No record |      |      |
| Number of men employed for moving refuse .. .. .                               | ”         | ”    | —    |

TABLE IV.—ZOMBA—*continued*.

## 10 MODE OF DISPOSAL OF EXCRETA, REFUSE, AND OFFAL.

|                          | Daily average number of pails of excreta. |      |      | Daily average number of cartloads of refuse |      |      | Daily average number of cartloads of Slaughter House and Market Offal. |      |      |
|--------------------------|-------------------------------------------|------|------|---------------------------------------------|------|------|------------------------------------------------------------------------|------|------|
|                          | 1911                                      | 1912 | 1913 | 1911                                        | 1912 | 1913 | 1911                                                                   | 1912 | 1913 |
| Buried or trenched ...   | 55                                        | 55   | 56   | —                                           | —    | —    | —                                                                      | —    | —    |
| Burnt ...                | —                                         | —    | —    | —                                           | —    | —    | —                                                                      | —    | —    |
| Thrown into sea ...      | —                                         | —    | —    | —                                           | —    | —    | —                                                                      | —    | —    |
| Otherwise dealt with ... | —                                         | —    | —    | —                                           | —    | —    | —                                                                      | —    | —    |

State mode of disposal.

## 11. AVERAGE DAILY NUMBER OF CARTLOADS OF TIN CANS, BOTTLES, BROKEN CROCKERY, AND OTHER INCOMBUSTIBLE MATERIAL REMOVED FROM HOUSES, HUTS, AND COMPOUNDS.

| 1911      | 1912      | 1913      |
|-----------|-----------|-----------|
| No record | No record | No record |

## 12. WATER SUPPLY.

| Nature of Water Supply.                                                      | 1911  | 1912  | 1913  |
|------------------------------------------------------------------------------|-------|-------|-------|
| Pipe-borne water :—                                                          |       |       |       |
| Source (river, lake, or spring) :—                                           | River | River | River |
| Number of linear yards ...                                                   | —     | —     | —     |
| Number of stand-pipes along roads ...                                        | —     | —     | —     |
| Number of stand-pipes in compounds and houses ...                            | —     | —     | —     |
| Wells :—                                                                     |       |       |       |
| Public :—                                                                    |       |       |       |
| Number ...                                                                   | 1     | 1     | Nil   |
| Number with pumps protected against surface water and mosquito-protected ... | —     | —     | —     |
| Private :—                                                                   |       |       |       |
| Number ...                                                                   | —     | —     | —     |
| Number protected against surface water and mosquito-protected ...            | —     | —     | —     |
| Tanks :—                                                                     |       |       |       |
| Public :—                                                                    |       |       |       |
| Number underground ...                                                       | Nil   | Nil   | Nil   |
| Number mosquito-protected and served by pumps ...                            | —     | —     | —     |
| Number above ground ...                                                      | —     | —     | —     |
| Number mosquito-protected ...                                                | —     | —     | —     |
| Number of 400 gallons capacity or less ...                                   | —     | —     | —     |
| Number above 400 gallons ...                                                 | —     | —     | —     |
| Private :—                                                                   |       |       |       |
| Number underground ...                                                       | Nil   | Nil   | Nil   |
| Number mosquito-protected ...                                                | —     | —     | —     |
| Number above ground ...                                                      | 1     | 1     | 1     |
| Number mosquito-protected ...                                                | 1     | 1     | 1     |
| Number of 400 gallons capacity or less ...                                   | 1     | 1     | 1     |
| Number above 400 gallons ...                                                 | —     | —     | —     |

TABLE IV.—ZOMBA—*continued*.WATER SUPPLY—*continued*.

| Nature of Water Supply.          | 1911 | 1912 | 1913 |
|----------------------------------|------|------|------|
| Nature of tanks :—               |      |      |      |
| Wood ... ..                      | Nil  | Nil  | Nil  |
| Iron ... ..                      | 1    | 1    | 1    |
| Concrete ... ..                  | Nil  | Nil  | Nil  |
| Barrels :—                       |      |      |      |
| Number ... ..                    | Nil  | Nil  | Nil  |
| Number mosquito-protected ... .. | —    | —    | —    |

## 13. DRAINAGE.

| Nature of Drainage.                                       | Public.       | Private.   |
|-----------------------------------------------------------|---------------|------------|
| Masonry drains :—                                         |               |            |
| Lineal yards of masonry drains :—                         |               |            |
| 1911 ... ..                                               | 890           | Nil        |
| 1912 ... ..                                               | "             | "          |
| 1913 ... ..                                               | "             | "          |
| Lineal yards reconstructed during the year :—             |               |            |
| 1911 ... ..                                               | Nil           | Nil        |
| 1912 ... ..                                               | "             | "          |
| 1913 ... ..                                               | "             | "          |
| Lineal yards repaired during the year :—                  |               |            |
| 1911 ... ..                                               | "             | "          |
| 1912 ... ..                                               | "             | "          |
| 1913 ... ..                                               | "             | "          |
| Lineal yards of new drains constructed during the year :— |               |            |
| 1911 ... ..                                               | "             | "          |
| 1912 ... ..                                               | "             | "          |
| 1913 ... ..                                               | "             | "          |
| Earth drains or ditches :—                                |               |            |
| Number of linear yards of ditches cleaned :—              |               |            |
| 1911 ... ..                                               | No record.    | No record. |
| 1912 ... ..                                               | "             | "          |
| 1913 ... ..                                               | "             | "          |
| Number of linear yards of ditches dug and graded :—       |               |            |
| 1911 ... ..                                               | "             | "          |
| 1912 ... ..                                               | "             | "          |
| 1913 ... ..                                               | "             | "          |
| Average frequency of clearing ditches of grass :—         |               |            |
| 1911 ... ..                                               | Periodically. |            |
| 1912 ... ..                                               | "             |            |
| 1913 ... ..                                               | "             |            |

## 14. CLEARANCE OF UNDERGROWTH, LONG GRASS, AND JUNGLE.

|                                                                               | 1911          | 1912 | 1913 |
|-------------------------------------------------------------------------------|---------------|------|------|
| Number of square yards of weeds, grass, and vegetation cut and removed ... .. | No record.    |      |      |
| Average frequency of clearance of rank vegetation on same area ... ..         | Periodically. |      |      |

TABLE IV.—ZOMBA—*continued*.

## 15. EXCAVATIONS AND LOW-LYING LAND.

|                                                                                    | 1911 | 1912 | 1913 |
|------------------------------------------------------------------------------------|------|------|------|
| Number of pools and excavations ... ..                                             | —    | 13   | 2    |
| Number of excavations filled up ... ..                                             | —    | 10   | 2    |
| Amount of low-lying and marsh land raised and drained ...                          | —    | —    | —    |
| Number of pools, marshes, streams, &c., fish-stocked .                             | —    | —    | —    |
| Number of cubic yards of material used for filling up pools and excavations ... .. | —    | —    | —    |
| Number of persons fined for making new excavations                                 | —    | —    | —    |
| Average number of men daily employed in filling up pools &c. ... ..                | —    | —    | —    |

## 16. OILING.

|                                                                                                 | 1911 | 1912 | 1913 |
|-------------------------------------------------------------------------------------------------|------|------|------|
| Number of drains oiled . ... ..                                                                 | Nil  | Nil  | Nil  |
| Number of pools and excavations oiled ... ..                                                    | —    | —    | —    |
| Number of tauks and barrels oiled ... ..                                                        | —    | —    | —    |
| Average number of men daily employed for oiling drains, pools, and watertanks or barrels ... .. | —    | —    | —    |

## 17. INSPECTIONS AND PROSECUTIONS.

|                                                                                     | 1911 | 1912 | 1913 |
|-------------------------------------------------------------------------------------|------|------|------|
| Number of inspectors employed ... ..                                                | —    | 2    | 2    |
| Number of houses inspected ... ..                                                   | 55   | 55   | 56   |
| Number of houses where larvae were found ...                                        | —    | 22   | 6    |
| Number of notices served to remove conditions causing the breeding of larvae ... .. | —    | —    | 4    |
| Number of persons fined for having mosquiton larvae on premises ... ..              | —    | —    | 1    |
| Number of notices served to remove insanitary conditons on premises ... ..          | —    | 72   | 30   |
| Number of persons fined for not removing insanitary conditions after notice ... ..  | —    | 12   | 4    |
| Number of soda and aerated water factories inspected                                | —    | 1    | 1    |

TABLE IV.—*continued.*SUMMARY OF ROUTINE SANITARY WORK DONE DURING THE YEAR  
IN THE TOWN.

## 1. NAME OF TOWN.—FORT JOHNSTON.

| —    |     |     |     | Approximate<br>area. | Number of<br>proclaimed open<br>spaces. |
|------|-----|-----|-----|----------------------|-----------------------------------------|
| 1911 | ... | ... | ... | 44 acres             | Nil                                     |
| 1912 | ... | ... | ... | "                    | "                                       |
| 1913 | ... | ... | ... | "                    | "                                       |

## 2. POPULATION.

| —    |     |     |     | Number of Natives. |          | Number of Europeans. |          | Total. |
|------|-----|-----|-----|--------------------|----------|----------------------|----------|--------|
|      |     |     |     | Males.             | Females. | Males.               | Females. |        |
| 1911 | ... | ... | ... | 73                 | 24       | 15                   | 1        | 113    |
| 1912 | ... | ... | ... | 76                 | 21       | 51                   | 6        | 118    |
| 1913 | ... | ... | ... | 77                 | 26       | 11                   | 1        | 115    |

## 3. HOUSING.

| —                  |     |     |     | Number occupied<br>by Europeans. | Number occupied<br>by Natives. |
|--------------------|-----|-----|-----|----------------------------------|--------------------------------|
| Number of Houses:— |     |     |     |                                  |                                |
| 1911               | ... | ... | ... | 12                               | Nil                            |
| 1912               | ... | ... | ... | 12                               | "                              |
| 1913               | ... | ... | ... | 13                               | "                              |
| Number of Huts:—   |     |     |     |                                  |                                |
| 1911               | ... | ... | ... | Nil                              | 36                             |
| 1912               | ... | ... | ... | "                                | 33                             |
| 1913               | ... | ... | ... | "                                | 35                             |

## 4. MOSQUITO PROTECTION OF HOUSES.

| —                                                            | 1911 | 1912 | 1913 |
|--------------------------------------------------------------|------|------|------|
| Number of European houses wholly mosquito-protected          | Nil  | Nil  | Nil  |
| Number of European houses with mosquito room                 | 8    | 9    | 11   |
| Number rendered during the year wholly mosquito-protected    | Nil  | Nil  | Nil  |
| Number rendered during the year partially mosquito-protected | "    | 1    | 2    |

TABLE IV.—FORT JOHNSTON—*continued*.

## 5. ERECTION OF NEW BUILDINGS DURING THE YEAR.

|                                                                                                                   | 1911 | 1912 | 1913 |
|-------------------------------------------------------------------------------------------------------------------|------|------|------|
| Number of public buildings erected with sanction as to site, construction, and relation to other buildings ... .. | Nil  | Nil  | Nil  |
| Number of houses erected with sanction as to site, construction, and relation to other buildings ... ..           | "    | "    | 1    |
| Number of huts erected with sanction as to site, construction, and relation to other buildings ... ..             | "    | "    | Nil  |
| Number of houses built without sanction ... ..                                                                    | "    | "    | "    |
| Number of huts built without sanction ... ..                                                                      | "    | "    | "    |

## ACTION TAKEN.

|             | Number of Prosecutions |         | Number demolished. |         |
|-------------|------------------------|---------|--------------------|---------|
|             | Huts.                  | Houses. | Huts.              | Houses. |
| 1911 ... .. | Nil                    | Nil     | Nil                | Nil     |
| 1912 ... .. | "                      | "       | "                  | "       |
| 1913 ... .. | "                      | "       | 2                  | "       |

## 6. MARKETS.

|             | Total number. | Number paved and drained. | Number unpaved. |
|-------------|---------------|---------------------------|-----------------|
| 1911 ... .. | 1             | Nil                       | 1               |
| 1912 ... .. | 1             | "                         | 1               |
| 1913 ... .. | 2             | "                         | 2               |

## 7. SLAUGHTER-HOUSES.

|             | Total number. | Number paved and drained. | Number unpaved. |
|-------------|---------------|---------------------------|-----------------|
| 1911 ... .. | Nil           | —                         | —               |
| 1912 ... .. | "             | —                         | —               |
| 1913 ... .. | "             | —                         | —               |

TABLE IV.—FORT JOHNSTON—*continued*.

## 8. LATRINES.

|                                                         | For Males. |                  | For Females. |                  |
|---------------------------------------------------------|------------|------------------|--------------|------------------|
|                                                         | Number.    | Number of seats. | Number.      | Number of seats. |
| Number of Public Latrines:—                             |            |                  |              |                  |
| 1911 .. .. .                                            | 1          | Trench           | 1            | Trench           |
| 1912 .. .. .                                            | 1          | "                | 1            | "                |
| 1913 .. .. .                                            | 2          | "                | 1            | "                |
| Number of new Public Latrines erected during the year:— |            |                  |              |                  |
| 1911 .. .. .                                            | Nil        | —                | Nil          | —                |
| 1912 .. .. .                                            | "          | —                | "            | —                |
| 1913 .. .. .                                            | 1          | —                | "            | —                |
| Number of Public Latrines repaired during the year:—    |            |                  |              |                  |
| 1911 .. .. .                                            | Nil        | —                | "            | —                |
| 1912 .. .. .                                            | "          | —                | "            | —                |
| 1913 .. .. .                                            | 1          | Trench           | 1            | Trench           |
| Number of Public Latrines demolished during the year:—  |            |                  |              |                  |
| 1911 .. .. .                                            | Nil        | "                | Nil          | —                |
| 1912 .. .. .                                            | "          | "                | "            | —                |
| 1913 .. .. .                                            | "          | "                | "            | —                |

|                                                                               | 1911 | 1912 | 1913 |
|-------------------------------------------------------------------------------|------|------|------|
| Number of Private Latrines .. .. .                                            | 12   | 12   | 14   |
| Average number of pails of nightsoil removed daily ..                         | "    | "    | "    |
| Average number of soiled pails removed and clean pails substituted .. .. .    | Nil  | Nil  | Nil  |
| Number of nightsoil men employed to clean latrines and remove excreta .. .. . | 12   | 12   | 14   |
| Number of cesspools .. .. .                                                   | Nil  | Nil  | Nil  |
| Number of cesspools cleansed .. .. .                                          | —    | —    | —    |
| Number of new cesspools constructed during the year ..                        | —    | —    | —    |
| Number of old cesspools abolished .. .. .                                     | —    | —    | —    |
| Number of cesspools oiled regularly by Department ..                          | —    | —    | —    |

## 9. REMOVAL OF REFUSE.

|                                                                                | 1911                                      | 1912 | 1913 |
|--------------------------------------------------------------------------------|-------------------------------------------|------|------|
| Number of dustbins .. .. .                                                     | Nil                                       | Nil  | Nil  |
| Number of carts at work daily to remove refuse from streets                    | Refuse removed daily in boxes on baskets. |      |      |
| Amount of refuse removed daily .. .. .                                         |                                           |      |      |
| Number of carts at work daily to remove refuse from yards and premises... .. . |                                           |      |      |
| Amount of refuse removed daily from yards and premises ..                      |                                           |      |      |
| Number of men employed for moving refuse .. .. .                               |                                           |      |      |

TABLE IV.—FORT JOHNSTON—*continued*.

## 10 MODE OF DISPOSAL OF EXCRETA, REFUSE, AND OFFAL.

|                          | Daily average number of pails of excreta. |        |        | Daily average number of cartloads of refuse |      |      | Daily average number of cartloads of Slaughter House and Market Offal. |      |      |
|--------------------------|-------------------------------------------|--------|--------|---------------------------------------------|------|------|------------------------------------------------------------------------|------|------|
|                          | 1911                                      | 1912   | 1913   | 1911                                        | 1912 | 1913 | 1911                                                                   | 1912 | 1913 |
| Buried or trenched ...   | Buried                                    | Buried | Buried | Nil                                         | Nil  | Nil  | Nil                                                                    | Nil  | Nil  |
| Burnt ...                | —                                         | —      | —      | —                                           | —    | —    | —                                                                      | —    | —    |
| Thrown into sea ...      | —                                         | —      | —      | —                                           | —    | —    | —                                                                      | —    | —    |
| Otherwise dealt with ... | —                                         | —      | —      | —                                           | —    | —    | —                                                                      | —    | —    |

State mode of disposal.

## 11. AVERAGE DAILY NUMBER OF CARTLOADS OF TIN CANS, BOTTLES, BROKEN CROCKERY, AND OTHER INCOMBUSTIBLE MATERIAL REMOVED FROM HOUSES, HUTS, AND COMPOUNDS.

| 1911      | 1912      | 1913      |
|-----------|-----------|-----------|
| No record | No record | No record |

## 12. WATER SUPPLY.

| Nature of Water Supply.                                                      | 1911  | 1912  | 1913  |
|------------------------------------------------------------------------------|-------|-------|-------|
| Pipe-borne water :—                                                          |       |       |       |
| Source (river, lake, or spring) :—                                           | River | River | River |
| Number of linear yards ...                                                   | —     | —     | —     |
| Number of stand-pipes along roads ...                                        | —     | —     | —     |
| Number of stand-pipes in compounds and houses ...                            | —     | —     | —     |
| Wells :—                                                                     |       |       |       |
| Public :—                                                                    |       |       |       |
| Number ...                                                                   | Nil   | Nil   | Nil   |
| Number with pumps protected against surface water and mosquito-protected ... | —     | —     | —     |
| Private :—                                                                   |       |       |       |
| Number ...                                                                   | 3     | 3     | 3     |
| Number protected against surface water and mosquito-protected ...            | —     | —     | —     |
| Tanks :—                                                                     |       |       |       |
| Public :—                                                                    |       |       |       |
| Number underground ...                                                       | Nil   | Nil   | Nil   |
| Number mosquito-protected and served by pumps ...                            | —     | —     | —     |
| Number above ground ...                                                      | —     | —     | —     |
| Number mosquito-protected ...                                                | —     | —     | —     |
| Number of 400 gallons capacity or less ...                                   | —     | —     | —     |
| Number above 400 gallons ...                                                 | —     | —     | —     |
| Private :—                                                                   |       |       |       |
| Number underground ...                                                       | Nil   | Nil   | Nil   |
| Number mosquito-protected ...                                                | —     | —     | —     |
| Number above ground ...                                                      | —     | —     | —     |
| Number mosquito-protected ...                                                | —     | —     | —     |
| Number of 400 gallons capacity or less ...                                   | —     | —     | —     |
| Number above 400 gallons ...                                                 | —     | —     | —     |

TABLE IV.—FORT JOHNSTON—*continued*.WATER SUPPLY—*continued*.

| Nature of Water Supply.          | 1911 | 1912 | 1913 |
|----------------------------------|------|------|------|
| Nature of tanks:—                |      |      |      |
| Wood ... ..                      | —    | —    | —    |
| Iron ... ..                      | —    | —    | —    |
| Concrete ... ..                  | —    | —    | —    |
| Barrels:—                        |      |      |      |
| Number ... ..                    | —    | —    | —    |
| Number mosquito-protected ... .. | —    | —    | —    |

## 13. DRAINAGE.

| Nature of Drainage.                                      | Public.                             | Private. |
|----------------------------------------------------------|-------------------------------------|----------|
| Masonry drains:—                                         |                                     |          |
| Lineal yards of masonry drains:—                         | Brick gutters along sides of roads. |          |
| 1911 ... ..                                              |                                     | —        |
| 1912 ... ..                                              |                                     | —        |
| 1913 ... ..                                              | —                                   | —        |
| Lineal yards reconstructed during the year:—             |                                     |          |
| 1911 ... ..                                              | —                                   | —        |
| 1912 ... ..                                              | —                                   | —        |
| 1913 ... ..                                              | —                                   | —        |
| Lineal yards repaired during the year:—                  |                                     |          |
| 1911 ... ..                                              | —                                   | —        |
| 1912 ... ..                                              | —                                   | —        |
| 1913 ... ..                                              | —                                   | —        |
| Lineal yards of new drains constructed during the year:— |                                     |          |
| 1911 ... ..                                              | —                                   | —        |
| 1912 ... ..                                              | —                                   | —        |
| 1913 ... ..                                              | —                                   | —        |
| Earth drains or ditches:—                                |                                     |          |
| Number of linear yards of ditches cleaned:—              |                                     |          |
| 1911 ... ..                                              | —                                   | —        |
| 1912 ... ..                                              | —                                   | —        |
| 1913 ... ..                                              | —                                   | —        |
| Number of linear yards of ditches dug and graded:—       |                                     |          |
| 1911 ... ..                                              | —                                   | —        |
| 1912 ... ..                                              | —                                   | —        |
| 1913 ... ..                                              | —                                   | —        |
| Average frequency of clearing ditches of grass:—         |                                     |          |
| 1911 ... ..                                              | —                                   | —        |
| 1912 ... ..                                              | —                                   | —        |
| 1913 ... ..                                              | —                                   | —        |

## 14. CLEARANCE OF UNDERGROWTH, LONG GRASS, AND JUNGLE.

|                                                                               | 1911          | 1912 | 1913 |
|-------------------------------------------------------------------------------|---------------|------|------|
| Number of square yards of weeds, grass, and vegetation cut and removed ... .. | No record.    |      |      |
| Average frequency of clearance of rank vegetation on same area ... ..         | Periodically. |      |      |

TABLE IV.—FORT JOHNSTON—*continued*.

## 15. EXCAVATIONS AND LOW-LYING LAND.

|                                                                                    | 1911 | 1912 | 1913 |
|------------------------------------------------------------------------------------|------|------|------|
| Number of pools and excavations ... ..                                             | Nil  | Nil  | Nil  |
| Number of excavations filled up ... ..                                             | —    | —    | —    |
| Amount of low-lying and marsh land raised and drained ...                          | —    | —    | —    |
| Number of pools, marshes, streams, &c., fish-stocked ...                           | —    | —    | —    |
| Number of cubic yards of material used for filling up pools and excavations ... .. | —    | —    | —    |
| Number of persons fined for making new excavations ...                             | —    | —    | —    |
| Average number of men daily employed in filling up pools &c. ... ..                | —    | —    | —    |

## 16. OILING.

|                                                                                                 | 1911 | 1912 | 1913 |
|-------------------------------------------------------------------------------------------------|------|------|------|
| Number of drains oiled ... ..                                                                   | Nil  | Nil  | Nil  |
| Number of pools and excavations oiled ... ..                                                    | —    | —    | —    |
| Number of tanks and barrels oiled ... ..                                                        | —    | —    | —    |
| Average number of men daily employed for oiling drains, pools, and watertanks or barrels ... .. | —    | —    | —    |

## 17. INSPECTIONS AND PROSECUTIONS.

|                                                                                     | 1911 | 1912              | 1913 |
|-------------------------------------------------------------------------------------|------|-------------------|------|
| Number of inspectors employed ... ..                                                | M.   | O. H. inspectors. |      |
| Number of houses inspected ... ..                                                   | All  | All               | All  |
| Number of houses where larvae were found ...                                        | Nil  | Nil               | Nil  |
| Number of notices served to remove conditions causing the breeding of larvae ... .. | —    | —                 | —    |
| Number of persons fined for having mosquito larvae on premises ... ..               | —    | —                 | —    |
| Number of notices served to remove insanitary conditions on premises ... ..         | —    | —                 | 4    |
| Number of persons fined for not removing insanitary conditions after notice ... ..  | —    | —                 | —    |
| Number of soda and aerated water factories inspected ...                            | —    | —                 | —    |

TABLE V.—METEOROLOGICAL RETURN FOR THE YEAR 1913.

| — — —        | TEMPERATURE.      |                   |                   |        |       | RAINFALL.            |                        | WINDS.                |                   | REMARKS. |  |
|--------------|-------------------|-------------------|-------------------|--------|-------|----------------------|------------------------|-----------------------|-------------------|----------|--|
|              | Solar<br>Maximum. | Shade<br>Maximum. | Shade<br>Minimum. | Range. | Mean. | Amount in<br>inches. | Degree of<br>Humidity. | General<br>Direction. | Average<br>Force. |          |  |
|              |                   |                   |                   |        |       |                      |                        |                       |                   |          |  |
| January      | ...               | 145               | 84.8              | 60     | 24.8  | 71                   | 8.87                   | 83                    | E                 | 0.3      |  |
| February     | ..                | 146               | 85                | 62.4   | 23.6  | 72                   | 6.04                   | 83                    | S.W.              | 0.9      |  |
| March        | ...               | 145               | 82.8              | 58     | 24.8  | 69                   | 13.24                  | 82                    | E                 | 0.9      |  |
| April ...    | ...               | 138               | 80.9              | 58     | 22.9  | 69                   | 4.67                   | 84                    | E                 | 0.4      |  |
| May ...      | ...               | 138               | 78                | 55     | 23    | 66                   | 2.66                   | 82                    | E                 | 0.4      |  |
| June ...     | ...               | 129               | 76                | 47     | 29    | 61                   | .70                    | 77                    | S                 | 0.3      |  |
| July ...     | ...               | 127               | 77                | 48     | 29    | 63                   | Nil                    | 74                    | E                 | 0.6      |  |
| August       | ...               | 129               | 78                | 50.8   | 28.2  | 64                   | Nil                    | 70                    | E                 | 0.7      |  |
| September    | ...               | 128               | 85                | 53     | 32    | 67                   | .26                    | 68                    | E                 | 1.1      |  |
| October      | ...               | 140               | 92                | 54     | 38    | 73                   | 1.52                   | 62                    | E                 | 0.12     |  |
| November     | ...               | 137               | 92.5              | 59     | 33.5  | 75                   | 9.13                   | 67                    | E                 | 0.5      |  |
| December     | ...               | 130               | 91                | 59     | 32    | 74                   | 4.64                   | 71                    | E                 | 0.5      |  |
| Year's means | ...               | 136               | 83.6              | 55.3   |       | 69                   | Total<br>51.73         | 75                    |                   | .6       |  |

## V.—HOSPITALS AND DISPENSARIES.

The following is a list of Government Hospitals and Dispensaries in the Protectorate, in the year 1913; the patients treated at each of these institutions are shown in the nosological returns which are appended.

## PORT HERALD.

(1). *Native Hospital.* (2). *Native Dispensary*

The Native Hospital is still in course of erection, but owing to lack of funds it has only been possible to build a ward for males, 20 × 25 feet. An extension is necessary so as to provide a smaller ward for females, and an operating room. In-patients have, in the meanwhile, been treated in a hut.

## MLANJE.

*Native Dispensary.*

This building is also in course of erection. It consists of a single room, 12 × 16 feet, and it is not expected that the sum voted will allow of anything but a grass roof.

## BLANTYRE.

(1). *European Hospital, (6 beds).* (2). *Native Dispensary.*

There is no Native Hospital at this station, the Government having arranged with the Church of Scotland Mission to treat their in-patients, for which a grant of £20 per annum is made to the Mission.

## ZOMBA.

(1). *European Hospital, (6 beds).* (2). *Native Hospital, (22 beds).*

This building is also the property of the Church of Scotland Mission, and has been lent to the Government on the understanding that the annual ground-rent of £10 is paid by Government.

(3). *Hospital for Native Troops, (12 beds).* (4). *Hospital for Prisoners, (12 beds).*  
(5). *Native Dispensary.*

The building consists of three rooms, one of which is an operating room. It is the property of the Church of Scotland Mission.

(6). *Camp Dispensary.*

For Troops and Followers.

## FORT JOHNSTON.

(1). *European Hospital, (2-3 beds).* (2). *Native Hospital, (6 beds).* (3). *Native Dispensary.*

## KOTA KOTA.

A building, 18 × 20 feet, with a grass roof, has been erected during the year. It was originally intended to build a Native Hospital at this station, but owing to lack of funds the present building was substituted, which it is proposed to use as a Dispensary for natives.

In the last Annual Medical Report of the Protectorate it was hoped that Native Hospitals would be provided at stations where at present only Dispensaries exist; the stringency of the existing financial position will, however, not admit of this being done.

Medical Officers continue to point out that the need for Native Hospitals is often severely felt, as from time to time natives are brought in seriously injured, or suffering from some grave illness, and that such cases cannot be treated as out-patients.

It is felt that if serious cases are to be sent back to their homes when brought to a Medical Officer for treatment, they will soon cease to be brought; and the Medical Officer will thus be precluded from attending to one of his principal functions, namely, making himself acquainted with the diseases prevalent amongst the native population of his district.

There is another point, however, which was referred to in the last report, and which again needs to be emphasised. There can be no question but that an adequate subordinate staff is necessary if Native Hospitals and Dispensaries are to be efficiently maintained, and this can only be done if Sub-Assistant Surgeons are provided.

There are two such men stationed at Zomba, one on the civil and one on the military establishment, an arrangement which greatly simplifies the work of the Medical Officer at this station.

At all the out-stations, on the other hand, there is no such subordinate available; the result being that a Medical Officer is seriously handicapped by the lack of any skilled assistance, and when obliged to leave his station occasionally for short periods, continuity of attendance on the sick, which such institutions as Native Hospitals and Dispensaries necessarily call for, cannot be maintained during his absence.

As the diseases, in the Tables which follow, are distributed over a large number of institutions, the principal ones are here presented in tabular form, for facility of reference.

It is necessary to point out, however, that of the stations shown in this Table, Chiromo was occupied by a Medical Officer for six months only, Mlanje for nine months and Kota Kota for about six months. At Karonga the Medical Officer was mainly engaged in Ankylostomiasis work. Mangoche is an out-post at which there is merely a small detachment of the King's African Rifles stationed.

| Diseases.       | Port<br>Herald. | Chiromo. | Mlanje. | Blantyre. | Zomba. | Fort<br>Johnston. | Mangoche. | Kota Kota. | Karonga. | Totals. |
|-----------------|-----------------|----------|---------|-----------|--------|-------------------|-----------|------------|----------|---------|
| Dysentery       | 26              | 54       | 18      | 74        | 68     | 3                 | 5         | 5          | 30       | 283     |
| Gonorrhœa       | 9               | 3        | 3       | 14        | 9      | 6                 | 2         | 16         | —        | 62      |
| Leprosy         | —               | 1        | —       | 1         | 3      | 1                 | —         | 15         | 5        | 26      |
| Malaria         | 59              | 13       | 38      | 142       | 249    | 53                | 8         | 97         | 99       | 757     |
| Blackwater      | 1               | —        | 3       | 1         | 1      | 1                 | —         | —          | —        | 7       |
| Pneumonia       | 12              | 1        | 3       | 2         | 15     | —                 | 2         | 18         | 6        | 59      |
| Syphilis        | 23              | 2        | 4       | 9         | 44     | 26                | 1         | 14         | 8        | 131     |
| Tuberculosis    | 1               | 1        | 2       | 6         | 12     | 2                 | —         | 7          | 1        | 32      |
| Yaws            | —               | —        | 1       | 2         | 4      | 3                 | —         | 12         | 13       | 35      |
| Pellagra        | —               | —        | —       | —         | 89     | —                 | —         | —          | 1        | 90      |
| Epilepsy        | —               | —        | 2       | —         | 12     | —                 | —         | 2          | 2        | 18      |
| Bronchitis      | 107             | 40       | 109     | 69        | 478    | 67                | 37        | 18         | 13       | 938     |
| Pleurisy        | —               | —        | 25      | —         | 21     | 1                 | 2         | 3          | 6        | 58      |
| Dyspepsia       | 4               | —        | 14      | 4         | 149    | 4                 | —         | 3          | 15       | 193     |
| Enteritis       | 1               | —        | —       | —         | 1      | —                 | —         | 50         | —        | 52      |
| Diarrhoea       | 126             | 50       | 82      | 112       | 129    | 64                | 5         | 44         | 93       | 705     |
| Tumours         | 3               | —        | 4       | —         | 1      | 3                 | —         | 1          | 1        | 13      |
| Filariasis      | —               | —        | 1       | —         | —      | —                 | —         | —          | 2        | 3       |
| Ankylostomiasis | —               | —        | 14      | —         | 11     | 1                 | —         | 4          | 642      | 672     |

TABLE VI.

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1913.  
PORT HERALD HOSPITAL HUT.

| Diseases.                             | Admissions. | Deaths. |
|---------------------------------------|-------------|---------|
| INFECTIVE DISEASES.                   |             |         |
| Dysentery ... ..                      | 1           | —       |
| Malaria :—Aestivo-autumnal ... ..     | 4           | 1       |
| Pneumonia ... ..                      | 2           | —       |
| LOCAL DISEASES.                       |             |         |
| Digestive System :—Enteritis ... ..   | 1           | 1       |
| Hæmorrhoids ... ..                    | 1           | —       |
| Connective Tissue :—Cellutitis ... .. | 1           | —       |
| INJURIES.                             |             |         |
| Local ... ..                          | 3           | 1       |
| TUMORS.                               |             |         |
| Sarcoma ... ..                        | 1           | —       |
| Total ... ..                          | 14          | 3       |

BLANTYRE EUROPEAN HOSPITAL.

| Diseases.                                                 | Admissions. | Deaths. |
|-----------------------------------------------------------|-------------|---------|
| INFECTIVE DISEASES.                                       |             |         |
| Dysentery ... ..                                          | 2           | —       |
| Gonorrhœa ... ..                                          | 2           | —       |
| Malaria :—Tertian ... ..                                  | 16          | —       |
| Aestivo-autunnal ... ..                                   | 9           | —       |
| Black-water ... ..                                        | 1           | —       |
| Rheumatic Fevër ... ..                                    | 1           | —       |
| INTOXICATIONS.                                            |             |         |
| Alcoholism... ..                                          | 1           | —       |
| LOCAL DISEASES.                                           |             |         |
| Nervous System :—Cerebral Embolism ... ..                 | 1           | 1       |
| Hysteria ... ..                                           | 1           | —       |
| Pseudo-cyesis ... ..                                      | 1           | —       |
| Circulatory System :—Myocarditis ... ..                   | 1           | 1       |
| Digestive System :—Appendicitis ... ..                    | 1           | 1       |
| Abscess ... ..                                            | 2           | 1       |
| Jaundice ... ..                                           | 2           | —       |
| Lymphatic System :—Inflammation of Lymphatic Gland ... .. | 1           | —       |
| Generative System :— (Male Organs) Prostatitis ... ..     | 2           | —       |
| (Female Organs) Postpartem Hæmorrhage ... ..              | 1           | —       |
| INJURIES.                                                 |             |         |
| Local ... ..                                              | 2           | —       |
| Total ... ..                                              | 47          | 4       |

TABLE VI.—IN-PATIENTS—*continued.*

## ZOMBA EUROPEAN HOSPITAL.

| Diseases.                                                 | Admissions. | Deaths. |
|-----------------------------------------------------------|-------------|---------|
| INFECTIVE DISEASES.                                       |             |         |
| Enteric ... ..                                            | 2           | 1       |
| Malaria :—Aestivo-autumnal ... ..                         | 6           | —       |
| Black-water ... ..                                        | 1           | —       |
| Septicaemia ... ..                                        | 1           | 1       |
| LOCAL DISEASES.                                           |             |         |
| Nervous System :—Concussion ... ..                        | 1           | —       |
| Digestive System :—Gastritis ... ..                       | 1           | —       |
| Enteritis ... ..                                          | 1           | —       |
| Colitis ... ..                                            | 1           | —       |
| Hæmorrhoids ... ..                                        | 1           | —       |
| Lymphatic System :—Inflammation of Lymphatic Gland ... .. | 1           | —       |
| Suppuration of Lymphatic Gland ... ..                     | 1           | —       |
| Lymphangitis ... ..                                       | 1           | —       |
| Generative System :—(Female Organs) Labour ... ..         | 1           | —       |
| Connective Tissue :—Cellulitis ... ..                     | 1           | —       |
| Diseases of the Skin :—Ulcers ... ..                      | 3           | —       |
| INJURIES.                                                 |             |         |
| Local ... ..                                              | 3           | —       |
|                                                           | 26          | 2       |

## FORT JOHNSTON NATIVE HOSPITAL.

| Diseases.                                  | Admissions. | Deaths. |
|--------------------------------------------|-------------|---------|
| INFECTIVE DISEASES.                        |             |         |
| Leprosy :—Nodular ... ..                   | 1           | —       |
| Malaria :—Aestivo-autumnal ... ..          | 2           | —       |
| Syphilis :—Secondary ... ..                | 4           | —       |
| Tertiary ... ..                            | 4           | —       |
| Tuberculosis ... ..                        | 1           | 1       |
| Yaws ... ..                                | 1           | —       |
| GENERAL DISEASES.                          |             |         |
| Muscular Rheumatism ... ..                 | 1           | —       |
| LOCAL DISEASES.                            |             |         |
| Nervous System :—Spastic Paraplegia ... .. | 3           | —       |
| (Mental) Dementia ... ..                   | 1           | —       |
| Digestive System :—Diarrhœa ... ..         | 1           | —       |
| Constipation ... ..                        | 1           | —       |
| Ascites ... ..                             | 1           | —       |
| Connective Tissue :—Cellulitis ... ..      | 4           | —       |
| Abscess ... ..                             | 2           | —       |
| Diseases of the Skin :—Ulcers ... ..       | 46          | —       |
| INJURIES.                                  |             |         |
| Local ... ..                               | 15          | 1       |
| TUMOURS.                                   |             |         |
| Tumours ... ..                             | 1           | —       |
| Total ... ..                               | 89          | 2       |

TABLE VI.—IN PATIENTS—*continued.*

ZOMBA NATIVE HOSPITAL.

| Diseases.                                         | Admissions. | Deaths. |
|---------------------------------------------------|-------------|---------|
| INFECTIVE DISEASES.                               |             |         |
| Dysentery ... ..                                  | 3           | 1       |
| Enteric ... ..                                    | 2           | 1       |
| Gonorrhœa ... ..                                  | 1           | —       |
| Malaria :—Aestivo-autumnal ... ..                 | 8           | —       |
| Pneumonia ... ..                                  | 4           | 2       |
| Syphilis :—Primary ... ..                         | 8           | —       |
| Secondary ... ..                                  | 15          | 1       |
| Inherited ... ..                                  | 1           | 1       |
| Yaws ... ..                                       | 3           | —       |
| GENERAL DISEASES.                                 |             |         |
| Anæmia ... ..                                     | 5           | 1       |
| LOCAL DISEASES.                                   |             |         |
| Nervous System :—Epilepsy ... ..                  | 3           | 1       |
| Neuritis (optic) ... ..                           | 1           | —       |
| Tumour of Brain (?) ... ..                        | 1           | —       |
| (Mental) Mania ... ..                             | 1           | —       |
| Diseases of the Eye :—Keratitis ... ..            | 1           | —       |
| Diseases of the Nose :—Foreign Body ... ..        | 1           | —       |
| Digestive System :—Sore Throat ... ..             | 1           | —       |
| Colitis ... ..                                    | 1           | —       |
| Diarrhœa ... ..                                   | 3           | —       |
| Abscess ... ..                                    | 1           | —       |
| Cirrhosis ... ..                                  | 1           | 1       |
| Obstruction of Bowels ... ..                      | 2           | 1       |
| Urinary System :—Acute Nephritis ... ..           | 1           | —       |
| Generative System :—(Male Organs) Orchitis ... .. | 1           | —       |
| (Female Organs) Rupture of Uterus ... ..          | 1           | 1       |
| Abortion ... ..                                   | 1           | —       |
| Delayed Labour ... ..                             | 1           | —       |
| Abscess of Breast ... ..                          | 1           | —       |
| Organs of Locomotion :—Osteitis ... ..            | 1           | —       |
| Periostitis ... ..                                | 1           | —       |
| Connective Tissue :—Cellulitis ... ..             | 2           | 1       |
| Abscess ... ..                                    | 3           | —       |
| Fibrositis ... ..                                 | 1           | —       |
| Gangrene ... ..                                   | 3           | —       |
| Diseases of the Skin :—Scabies ... ..             | 3           | —       |
| Ulcers ... ..                                     | 50          | —       |
| Impetigo ... ..                                   | 5           | —       |
| INJURIES.                                         |             |         |
| Local ... ..                                      | 20          | 2       |
| TUMOURS.                                          |             |         |
| Carcinoma of Pancreas ... ..                      | 1           | —       |
| ANIMAL PARASITES.                                 |             |         |
| Bilharziasis ... ..                               | 1           | —       |
| Nematoda :—Ankylostomiasis. ... ..                | 2           | —       |
| Total ... ..                                      | 166         | 14      |

TABLE VI.—IN-PATIENTS—*continued*.

HOSPITAL FOR NATIVE TROOPS, ZOMBA.

| Diseases.                                         | Admissions. | Deaths. |
|---------------------------------------------------|-------------|---------|
| INFECTIVE DISEASES.                               |             |         |
| Dysentery ... ..                                  | 3           | —       |
| Gonorrhœa ... ..                                  | 3           | —       |
| Malaria :—Aestivo-autumnal ... ..                 | 9           | —       |
| Pneumonia ... ..                                  | 5           | —       |
| Syphilis :—Secondary ... ..                       | 3           | —       |
| Tuberculosis ... ..                               | 1           | —       |
| Diseases of the Eye—Conjunctivitis ... ..         | 3           | —       |
| Respiratory System—Bronchitis ... ..              | 1           | —       |
| Emphysema and Asthma ... ..                       | 1           | —       |
| Pleurisy ... ..                                   | 1           | —       |
| LOCAL DISEASES.                                   |             |         |
| Digestive System :—Hernia ... ..                  | 1           | —       |
| Diarrhœa ... ..                                   | 4           | —       |
| Obstruction of Bowels ... ..                      | 1           | —       |
| Generative System :—(Male Organs) Orchitis ... .. | 1           | —       |
| Empididymitis ... ..                              | 1           | —       |
| Organs of Locomotion :—Synovitis ... ..           | 1           | —       |
| Fibrositis ... ..                                 | 5           | —       |
| Connective Tissue :—Cellulitis ... ..             | 2           | —       |
| Abscess ... ..                                    | 4           | —       |
| INJURIES.                                         |             |         |
| Local ... ..                                      | 1           | —       |
| ANIMAL PARASITES.                                 |             |         |
| Cestoda :—Tænia Solium ... ..                     | 3           | —       |
| Nematoda :—Ankylostomiasis ... ..                 | 1           | —       |
| Total ... ..                                      | 55          | —       |

CENTRAL PRISON HOSPITAL, ZOMBA.

| Diseases.                         | Admissions. | Deaths. |
|-----------------------------------|-------------|---------|
| INFECTIVE DISEASES.               |             |         |
| Chicken-pox ... ..                | 1           | —       |
| Dysentery ... ..                  | 20          | 2       |
| Malaria :—Aestivo-autumnal ... .. | 21          | —       |
| Pneumonia ... ..                  | 4           | —       |
| Tuberculosis ... ..               | 5           | 2       |
| Mumps ... ..                      | 2           | —       |
| INTOXICATIONS.                    |             |         |
| Others :—Pellagra ... ..          | 20          | 10      |
| GENERAL DISEASES.                 |             |         |
| Anaemia ... ..                    | 1           | —       |
| Carried forward ... ..            | 74          | 14      |

TABLE VI.—IN-PATIENTS—*continued*.CENTRAL PRISON HOSPITAL, ZOMBA.—*continued*.

| Diseases.                                   | Admissions. | Deaths. |
|---------------------------------------------|-------------|---------|
| <i>Brought forward.</i> ... ..              | 74          | 14      |
| LOCAL DISEASES.                             |             |         |
| Nervous System :—Paralysis ... ..           | 1           | —       |
| Epilepsy ... ..                             | 2           | —       |
| Diseases of the Eye :—Conjunctivitis ... .. | 1           | —       |
| Respiratory System :—Bronchitis ... ..      | 4           | —       |
| Pleurisy ... ..                             | 10          | —       |
| Digestive System :—Diarrhoea ... ..         | 2           | —       |
| Obstruction of Bowels ... ..                | 1           | —       |
| Organs of Locomotion :—Synovitis ... ..     | 1           | —       |
| Fibrositis ... ..                           | 1           | —       |
| Diseases of the Skin :—Urticaria ... ..     | 1           | —       |
| Eczema ... ..                               | 1           | —       |
| Lichen ... ..                               | 1           | —       |
| INJURIES.                                   |             |         |
| Local ... ..                                | 5           | —       |
| ANIMAL PARASITES.                           |             |         |
| Cestoda :— <i>Tænia Solium</i> ... ..       | 1           | —       |
| Nematoda :— <i>Ankylostomiasis</i> ... ..   | 1           | —       |
| Total ... ..                                | 107         | 14      |

TABLE VII.

RETURN OF DISEASES (OUT-PATIENTS) FOR THE YEAR 1913.

PORT HERALD EUROPEANS.

| Diseases.                            | Males. | Females. |
|--------------------------------------|--------|----------|
| INFECTIVE DISEASES.                  |        |          |
| Malaria :—Aestivo-autumnal ... ..    | 4      | —        |
| Syphilis :—Secondary ... ..          | 1      | —        |
| LOCAL DISEASES.                      |        |          |
| Nervous System :—Neuralgia ... ..    | 1      | —        |
| Generative System :—Orchitis ... ..  | 1      | —        |
| Diseases of the Skin :—Eczema ... .. | 1      | —        |
| Ulcer ... ..                         | 1      | —        |
| INJURIES.                            |        |          |
| Local ... ..                         | 2      | —        |
| SURGICAL OPERATIONS.                 |        |          |
| Extraction of Teeth ... ..           | 2      | —        |
|                                      | 13     | —        |

TABLE VII.—OUT-PATIENTS.—*continued.*

## PORT HERALD, NATIVES.

| Diseases.                                                 | Males. | Females. |
|-----------------------------------------------------------|--------|----------|
| INFECTIVE DISEASES.                                       |        |          |
| Dysentery ... ..                                          | 17     | 8        |
| Gonorrhœa ... ..                                          | 9      | —        |
| Malaria :—Aestivo-autumnal ... ..                         | 24     | 27       |
| Black-water ... .. (Asiatic).                             | 1      | —        |
| Measles ... ..                                            | 10     | 7        |
| Pneumonia ... ..                                          | 7      | 3        |
| Small-pox ... ..                                          | —      | 1        |
| Syphilis :—Primary ... ..                                 | —      | 1        |
| Secondary ... ..                                          | 16     | 5        |
| Tuberculosis ... ..                                       | 1      | —        |
| GENERAL DISEASES.                                         |        |          |
| Anaemia ... ..                                            | 3      | —        |
| Lumbago ... ..                                            | 1      | —        |
| LOCAL DISEASES.                                           |        |          |
| Nervous System :—Meningitis ... ..                        | 1      | —        |
| Neuralgia ... ..                                          | 28     | 14       |
| Hysteria ... ..                                           | 3      | 1        |
| Neurasthenia ... ..                                       | 1      | —        |
| Diseases of the Eye :—Conjunctivitis ... ..               | 17     | 14       |
| Diseases of the Ear :—Inflammation ... ..                 | 16     | 13       |
| Other Diseases ... ..                                     | 2      | 1        |
| Diseases of the Nose :—Rhinitis ... ..                    | 1      | —        |
| Respiratory System :—Bronchitis ... ..                    | 62     | 45       |
| Asthma ... ..                                             | 1      | —        |
| Coryza ... ..                                             | 5      | 1        |
| Digestive System :—Stomatitis ... ..                      | 1      | —        |
| Caries of Teeth ... ..                                    | 37     | 40       |
| Sore Throat ... ..                                        | 3      | —        |
| Inflammation of Tonsils ... ..                            | 4      | —        |
| Dyspepsia ... ..                                          | 4      | —        |
| Diarrhœa ... ..                                           | 72     | 54       |
| Constipation ... ..                                       | 27     | 16       |
| Colic ... ..                                              | 4      | —        |
| Abscess ... ..                                            | 1      | —        |
| Lymphatic System :—Inflammation of Lymphatic Gland ... .. | 1      | —        |
| Urinary System :—Cystitis ... ..                          | 1      | —        |
| Hæmaturia ... ..                                          | 6      | —        |
| Generative System :—Urethritis ... ..                     | 1      | —        |
| Orchitis ... ..                                           | 8      | —        |
| Abortion ... ..                                           | —      | 1        |
| Mastitis ... ..                                           | —      | 1        |
| Organs of Locomotion :—Synovitis ... ..                   | 7      | 3        |
| Fibrositis ... ..                                         | 19     | 5        |
| Ganglion ... ..                                           | 1      | —        |
| Connective Tissue :—Cellulitis ... ..                     | 14     | 8        |
| Abscess ... ..                                            | 4      | 1        |
| Diseases of the Skin :—Urticaria ... ..                   | 1      | —        |
| Eczema ... ..                                             | 5      | 2        |
| Boil ... ..                                               | 20     | 6        |
| Psoriasis ... ..                                          | 1      | —        |
| Scabies ... ..                                            | 33     | 25       |
| Ulcers ... ..                                             | 156    | 89       |
| Carried forward ... ..                                    | 657    | 392      |



TABLE VII.—OUT-PATIENTS.—*continued.*

## MLANJE DISPENSARY.

| Diseases.                                                 | Males. | Females. |
|-----------------------------------------------------------|--------|----------|
| INFECTIVE DISEASES.                                       |        |          |
| Chicken-pox ... ..                                        | 1      | —        |
| Dysentery ... ..                                          | 9      | 9        |
| Gonorrhœa ... ..                                          | 3      | —        |
| Leprosy :—Anæsthetic ... ..                               | 2      | —        |
| Malaria :—Tertian ... ..                                  | 1      | —        |
| Æstivo-autumnal ... ..                                    | 33     | 4        |
| Black-water ... ..                                        | 3      | —        |
| Measles ... ..                                            | 1      | —        |
| Pneumonia ... ..                                          | 2      | 1        |
| Syphilis :—Secondary ... ..                               | 3      | —        |
| Inherited ... ..                                          | 1      | —        |
| Tuberculosis ... ..                                       | 2      | —        |
| Yaws ... ..                                               | 1      | —        |
| LOCAL DISEASES.                                           |        |          |
| Nervous System :—Epilepsy ... ..                          | 2      | —        |
| Neuralgia ... ..                                          | 20     | 1        |
| Hysteria ... ..                                           | —      | 1        |
| Mental Diseases :—Melancholia ... ..                      | 1      | —        |
| Delusional Insanity ... ..                                | 1      | —        |
| Diseases of the Eye :—Conjunctivitis ... ..               | 17     | 2        |
| Diseases of the Ear :—Inflammation ... ..                 | 4      | —        |
| Diseases of the Nose :—Foreign Body ... ..                | 1      | —        |
| Respiratory System :—Laryngitis ... ..                    | 6      | —        |
| Bronchitis ... ..                                         | 107    | 2        |
| Pleurisy ... ..                                           | 25     | —        |
| Digestive System :—Stomatitis ... ..                      | 6      | 2        |
| Caries of Teeth ... ..                                    | 7      | 1        |
| Sore Throat ... ..                                        | 2      | 1        |
| Inflammation of Tonsils ... ..                            | —      | 1        |
| Hæmatemesis ... ..                                        | 1      | —        |
| Dyspepsia ... ..                                          | 9      | 5        |
| Ulceration of Intestines ... ..                           | 5      | —        |
| Hernia ... ..                                             | 2      | —        |
| Diarrhœa ... ..                                           | 77     | 5        |
| Constipation ... ..                                       | 60     | 1        |
| Colic ... ..                                              | 7      | 2        |
| Hepatitis—Acute ... ..                                    | 1      | —        |
| Ascites ... ..                                            | 2      | —        |
| Lymphatic System :—Inflammation of Lymphatic Gland ... .. | 2      | —        |
| Suppuration of Lymphatic Gland ... ..                     | 8      | —        |
| Lymphangitis ... ..                                       | 1      | —        |
| Elephantiasis ... ..                                      | 1      | —        |
| Urinary System :—Renal Colic ... ..                       | 1      | —        |
| Cystitis ... ..                                           | 1      | —        |
| Hæmaturia ... ..                                          | 3      | 1        |
| Generative System :—Gleet ... ..                          | 2      | —        |
| Soft Chancre ... ..                                       | 2      | —        |
| Ovaritis ... ..                                           | —      | 1        |
| Organs of Locomotion :—Osteitis ... ..                    | —      | 1        |
| Arthritis ... ..                                          | 30     | 1        |
| Bursitis ... ..                                           | 1      | —        |
| Connective Tissue :—Cellutis ... ..                       | 15     | —        |
| Abscess ... ..                                            | 11     | 3        |
| Carried forward ... ..                                    | 403    | 45       |

TABLE VII.—OUT-PATIENTS.—*continued.*

MLANJE DISPENSARY.—*continued.*

| Diseases.                          |     |                 |     |     |     |     |     | Males. | Females. |
|------------------------------------|-----|-----------------|-----|-----|-----|-----|-----|--------|----------|
| <i>Brought forward</i> ... ..      |     |                 |     |     |     |     |     | 403    | 45       |
| LOCAL DISEASES— <i>continued</i> . |     |                 |     |     |     |     |     |        |          |
| Diseases of the Skin :—            |     | Urticaria       | ... | ... | ... | ... | ... | 1      | 1        |
|                                    |     | Eczema          | ... | ... | ... | ... | ... | 5      | —        |
|                                    |     | Boil            | ... | ... | ... | ... | ... | 4      | —        |
|                                    |     | Carbuncle       | ... | ... | ... | ... | ... | 1      | —        |
|                                    |     | Psoriasis       | ... | ... | ... | ... | ... | 3      | —        |
|                                    |     | Tinea           | ... | ... | ... | ... | ... | 7      | —        |
|                                    |     | Scabies         | ... | ... | ... | ... | ... | 28     | —        |
| INJURIES.                          |     |                 |     |     |     |     |     |        |          |
| General                            | ... | ...             | ... | ... | ... | ... | ... | 3      | —        |
| Local                              | ... | ...             | ... | ... | ... | ... | ... | 314    | 2        |
| SURGICAL OPERATIONS.               |     |                 |     |     |     |     |     |        |          |
| Surgical Operations                |     | ...             | ... | ... | ... | ... | ... | 34     | 3        |
| TUMOURS.                           |     |                 |     |     |     |     |     |        |          |
| Tumours                            |     | ...             | ... | ... | ... | ... | ... | 4      | —        |
| ANIMAL PARASITES.                  |     |                 |     |     |     |     |     |        |          |
| Nematoda :—                        |     | Ascaris         | ... | ... | ... | ... | ... | 8      | —        |
|                                    |     | Filariasis      | ... | ... | ... | ... | ... | 1      | —        |
|                                    |     | Ankylostomiasis | ... | ... | ... | ... | ... | 14     | —        |
| Insecta :—                         |     | Myiasis         | ... | ... | ... | ... | ... | 2      | —        |
| Total                              |     |                 |     |     |     |     |     | 932    | 51       |

## BLANTYRE, EUROPEANS AND ASIATICS.

| Diseases.                          |     |     |     |     |     |     |     | Males. | Females. |
|------------------------------------|-----|-----|-----|-----|-----|-----|-----|--------|----------|
| INFECTIVE DISEASES.                |     |     |     |     |     |     |     |        |          |
| Chicken-pox                        | ... | ... | ... | ... | ... | ... | ... | 2      | —        |
| Dysentery                          | ... | ... | ... | ... | ... | ... | ... | 1      | —        |
| Gonorrhœa                          | ... | ... | ... | ... | ... | ... | ... | 7      | —        |
| Malaria :—Tertian                  | ... | ... | ... | ... | ... | ... | ... | 13     | —        |
| Aestivo-autumnal                   | ... | ... | ... | ... | ... | ... | ... | 7      | 1        |
| Syphilis :—Primary                 | ... | ... | ... | ... | ... | ... | ... | 7      | —        |
| Secondary                          | ... | ... | ... | ... | ... | ... | ... | 2      | —        |
| Tuberculosis                       | ... | ... | ... | ... | ... | ... | ... | 2      | —        |
| INTOXICATIONS.                     |     |     |     |     |     |     |     |        |          |
| Alcoholism                         | ... | ... | ... | ... | ... | ... | ... | 3      | —        |
| Others                             | ... | ... | ... | ... | ... | ... | ... | —      | 1        |
| LOCAL DISEASES.                    |     |     |     |     |     |     |     |        |          |
| Nervous System :—Neuralgia         | ... | ... | ... | ... | ... | ... | ... | 1      | —        |
| Diseases of the Eye :—Iritis       | ... | ... | ... | ... | ... | ... | ... | 1      | —        |
| Diseases of the Ear :—Inflammation | ... | ... | ... | ... | ... | ... | ... | 2      | —        |
| Respiratory System :—Bronchitis    | ... | ... | ... | ... | ... | ... | ... | 3      | —        |
| Digestive System :—Dyspepsia       | ... | ... | ... | ... | ... | ... | ... | 3      | 1        |
| Generative System :—Soft Chancre   | ... | ... | ... | ... | ... | ... | ... | 2      | —        |
| Condyloma                          | ... | ... | ... | ... | ... | ... | ... | 1      | —        |
| Organs of Locomotion :—Fibrositis  | ... | ... | ... | ... | ... | ... | ... | 1      | —        |
| Connective Tissue :—Cellulitis     | ... | ... | ... | ... | ... | ... | ... | 2      | —        |
| Diseases of the Skin :—Boil        | ... | ... | ... | ... | ... | ... | ... | 3      | —        |
| Pemphigus                          | ... | ... | ... | ... | ... | ... | ... | 1      | —        |
| INJURIES.                          |     |     |     |     |     |     |     |        |          |
| Local                              | ... | ... | ... | ... | ... | ... | ... | 3      | —        |
|                                    |     |     |     |     |     |     |     | 67     | 3        |

TABLE VII.—OUT-PATIENTS.—*continued.*

ZOMBA, EUROPEANS.

| Diseases.                                                 | Males. | Females. |
|-----------------------------------------------------------|--------|----------|
| INFECTIVE DISEASES.                                       |        |          |
| Dysentery ... ..                                          | 1      | 1        |
| Enteric ... ..                                            | —      | 1        |
| Gonorrhœa ... ..                                          | 4      | —        |
| Malaria :—Aestivo-autumnal ... ..                         | 31     | 16       |
| Rheumatic Fever (sub-acute) ... ..                        | 1      | —        |
| Syphilis :—Primary ... ..                                 | 2      | —        |
| Secondary ... ..                                          | 2      | —        |
| Tuberculosis ... ..                                       | —      | 1        |
| INTOXICATIONS.                                            |        |          |
| Alcoholism ... ..                                         | 1      | —        |
| GENERAL DISEASES.                                         |        |          |
| Anaemia ... ..                                            | 2      | 1        |
| LOCAL DISEASES.                                           |        |          |
| Nervous System :—Neuralgia ... ..                         | 5      | 1        |
| Convulsions ... ..                                        | —      | 1        |
| Migraine ... ..                                           | —      | 1        |
| Insomnia ... ..                                           | 1      | —        |
| Diseases of the Eye :—Conjunctivitis ... ..               | 1      | 1        |
| Astigmatism ... ..                                        | 1      | 1        |
| Diseases of the Ear :—Inflammation ... ..                 | 2      | 1        |
| Diseases of the Nose :—Nasal Catarrh ... ..               | 4      | —        |
| Respiratory System :—Laryngitis ... ..                    | 2      | —        |
| Bronchitis ... ..                                         | 8      | 3        |
| Empyema ... ..                                            | 1      | —        |
| Digestive System :—Stomatitis ... ..                      | 3      | 3        |
| Caries of Teeth ... ..                                    | 9      | 6        |
| Glossitis ... ..                                          | 1      | —        |
| Sore Throat ... ..                                        | 2      | —        |
| Inflammation of Tonsils ... ..                            | 10     | —        |
| Gastritis ... ..                                          | 3      | 3        |
| Dyspepsia ... ..                                          | 7      | —        |
| Hernia ... ..                                             | 2      | —        |
| Diarrhœa ... ..                                           | 10     | 2        |
| Constipation ... ..                                       | —      | 1        |
| Colic ... ..                                              | 2      | —        |
| Hæmorrhoids ... ..                                        | 4      | —        |
| Ranula ... ..                                             | 1      | —        |
| Pyorrhœa ... ..                                           | 1      | —        |
| Pharyngitis ... ..                                        | 7      | —        |
| Lymphatic System :—Inflammation of Lymphatic Gland ... .. | 3      | —        |
| Suppuration of Lymphatic Gland ... ..                     | 1      | —        |
| Urinary System :—Cystitis ... ..                          | 1      | 1        |
| Hæmaturia ... ..                                          | 1      | —        |
| Generative System :—Phimosis ... ..                       | 1      | —        |
| Abortion ... ..                                           | —      | 1        |
| Displacement of Uterus ... ..                             | —      | 1        |
| Organs of Locomotion Arthritis ... ..                     | 4      | —        |
| Fibrositis ... ..                                         | 7      | 1        |
| Synovitis ... ..                                          | 2      | 1        |
| Connective Tissue :—Cellulitis ... ..                     | 4      | 1        |
| Abscess ... ..                                            | 3      | —        |
| Carried forward ... ..                                    | 158    | 50       |





TABLE VII.—OUT PATIENTS—*continued*.  
ZOMBA NATIVE DISPENSARY.—*continued*.

| Diseases.                                             |  |  |  |  | Males. | Females. |
|-------------------------------------------------------|--|--|--|--|--------|----------|
| <i>Brought forward.</i> ... ..                        |  |  |  |  | 183    | 52       |
| LOCAL DISEASES.— <i>continued</i> .                   |  |  |  |  |        |          |
| Diseases of the Nose:—Catarrh ... ..                  |  |  |  |  | 4      | —        |
| Foreign Body ... ..                                   |  |  |  |  | —      | 1        |
| Respiratory System:—Bronchitis ... ..                 |  |  |  |  | 124    | 14       |
| Broncho-pneumonia ... ..                              |  |  |  |  | 2      | —        |
| Pleurisy ... ..                                       |  |  |  |  | 3      | —        |
| Digestive System:—Stomatitis ... ..                   |  |  |  |  | 1      | 1        |
| Caries of Teeth ... ..                                |  |  |  |  | 88     | 22       |
| Sore Throat ... ..                                    |  |  |  |  | 1      | —        |
| Inflammation of Tonsils ..                            |  |  |  |  | 6      | —        |
| Dyspepsia ... ..                                      |  |  |  |  | 62     | 1        |
| Diarrhœa ... ..                                       |  |  |  |  | 18     | 4        |
| Constipation ... ..                                   |  |  |  |  | 146    | 15       |
| Colic ... ..                                          |  |  |  |  | 9      | 1        |
| Ascites ... ..                                        |  |  |  |  | 1      | —        |
| Lymphatic System:—Inflammation of Lymphatic Gland ... |  |  |  |  | 1      | —        |
| Generative System:—Endometritis ... ..                |  |  |  |  | —      | 1        |
| Menorrhagia ..                                        |  |  |  |  | —      | 1        |
| Organs of Locomotion:—Arthritis ... ..                |  |  |  |  | 1      | 1        |
| Fibrositis ... ..                                     |  |  |  |  | 66     | —        |
| Connective Tissue:—Cellulitis ... ..                  |  |  |  |  | 17     | —        |
| Abscess ... ..                                        |  |  |  |  | 5      | —        |
| Diseases of the Skin:—Urticaria ... ..                |  |  |  |  | —      | 1        |
| Uczema ... ..                                         |  |  |  |  | 5      | 1        |
| Boil ... ..                                           |  |  |  |  | 12     | —        |
| Herpes ... ..                                         |  |  |  |  | —      | 2        |
| Tinea ... ..                                          |  |  |  |  | 10     | 1        |
| Scabies ..                                            |  |  |  |  | 120    | 18       |
| Acne ... ..                                           |  |  |  |  | 1      | —        |
| Impetigo ... ..                                       |  |  |  |  | 4      | 2        |
| Lichen ... ..                                         |  |  |  |  | 2      | 2        |
| Ulcers ... ..                                         |  |  |  |  | 248    | 37       |
| INJURIES.                                             |  |  |  |  |        |          |
| Local ... ..                                          |  |  |  |  | 273    | 11       |
| ANIMAL PARASITES.                                     |  |  |  |  |        |          |
| Bilharziasis ... ..                                   |  |  |  |  | 4      | —        |
| Insecta:—Dermatophiliasis ... ..                      |  |  |  |  | 3      | 2        |
| Total ... ..                                          |  |  |  |  | 1,420  | 191      |

DISPENSARY FOR NATIVE TROOPS, ZOMBA.

| Diseases.                     |  |  |  |  | Males. | Females. |
|-------------------------------|--|--|--|--|--------|----------|
| INFECTIVE DISEASES.           |  |  |  |  |        |          |
| Beri-Beri ... ..              |  |  |  |  | 2      | —        |
| Dysentery ... ..              |  |  |  |  | 9      | 5        |
| <i>Carried forward</i> ... .. |  |  |  |  | 11     | 5        |

TABLE VII.—OUT-PATIENTS.—*continued.*DISPENSARY FOR NATIVES TROOPS, ZOMBA.—*continued.*

| Diseases.                                   | Males. | Females. |
|---------------------------------------------|--------|----------|
| <i>Brought forward</i> ... ..               | 11     | 5        |
| INFECTIVE DISEASES.— <i>continued.</i>      |        |          |
| Malaria :—Aestivo-autumnal ... ..           | 60     | 8        |
| Pneumonia ... ..                            | 2      | —        |
| Syphilis :—Secondary ... ..                 | 1      | —        |
| Tuberculosis ... ..                         | 1      | —        |
| INTOXICATIONS.                              |        |          |
| Others :—Pellagra ... ..                    | 13     | 7        |
| LOCAL DISEASES.                             |        |          |
| Nervous System :—Paralysis ... ..           | 1      | —        |
| Epilepsy ... ..                             | 3      | 4        |
| Neuralgia ... ..                            | 2      | 3        |
| Diseases of the Eye :—Conjunctivitis ... .. | 60     | 17       |
| Diseases of the Ear :—Inflammation ... ..   | 8      | 7        |
| Respiratory System :—Bronchitis ... ..      | 140    | 27       |
| Pleurisy ... ..                             | 7      | —        |
| Digestive System :—Caries of Teeth ... ..   | 7      | —        |
| Sore Throat ... ..                          | 35     | 16       |
| Inflammation of Tonsils ... ..              | 2      | —        |
| Dyspepsia ... ..                            | 31     | 13       |
| Hernia ... ..                               | 2      | —        |
| Diarrhoea ... ..                            | 50     | 10       |
| Constipation ... ..                         | 38     | 19       |
| Colic ... ..                                | 5      | —        |
| Lymphatic System :—Lymphangitis ... ..      | 1      | —        |
| Organs of Locomotion :—Synovitis ... ..     | 2      | —        |
| Fibrositis ... ..                           | 87     | 2        |
| Connective Tissue :—Cellulitis ... ..       | 17     | 4        |
| Abscess ... ..                              | 23     | 5        |
| Diseases of the Skin :—Eczema ... ..        | 6      | 2        |
| Boil ... ..                                 | 3      | —        |
| Herpes ... ..                               | 7      | —        |
| Tinea ... ..                                | 76     | 7        |
| Scabies ... ..                              | 95     | 14       |
| Ulcers ... ..                               | 9      | 8        |
| INJURIES.                                   |        |          |
| Local ... ..                                | 554    | 33       |
| ANIMAL PARASITES.                           |        |          |
| Nematoda :—Ankylostomiasis ... ..           | 6      | —        |
| Total ... ..                                | 1,355  | 211      |

## CENTRAL PRISON DISPENSARY, ZOMBA.

| Diseases.                         | Males. | Females. |
|-----------------------------------|--------|----------|
| INFECTIVE DISEASES.               |        |          |
| Dysentery ... ..                  | 13     | —        |
| Malaria :—Aestivo-autumnal ... .. | 21     | —        |
| <i>Carried forward</i> ... ..     | 34     | —        |

TABLE VII.—OUT PATIENTS—continued.

CENTRAL PRISON DISPENSARY, ZOMBA.—*continued.*

| Diseases.                            |     |     |     |     |     |     |     | Males. | Females. |
|--------------------------------------|-----|-----|-----|-----|-----|-----|-----|--------|----------|
| <i>Brought forward</i> ... ..        |     |     |     |     |     |     |     | 34     | —        |
| INTOXICATIONS.                       |     |     |     |     |     |     |     |        |          |
| Others :—Pellagra                    | ... | ... | ... | ... | ... | ... | ... | 43     | —        |
| GENERAL DISEASES.                    |     |     |     |     |     |     |     |        |          |
| Anæmia                               | ... | ... | ... | ... | ... | ... | ... | 3      | —        |
| LOCAL DISEASES.                      |     |     |     |     |     |     |     |        |          |
| Diseases of the Eye :—Conjunctivitis | ... | ... | ... | ... | ... | ... | ... | 16     | —        |
| Diseases of the Ear :—Inflammation   | ... | ... | ... | ... | ... | ... | ... | 13     | —        |
| Respiratory System :—Bronchitis      | ... | ... | ... | ... | ... | ... | ... | 157    | —        |
| Digestive System :—Caries of Teeth   | ... | ... | ... | ... | ... | ... | ... | 12     | —        |
| Sore Throat                          | ... | ... | ... | ... | ... | ... | ... | 5      | —        |
| Dyspepsia                            | ... | ... | ... | ... | ... | ... | ... | 35     | —        |
| Diarrhœa                             | ... | ... | ... | ... | ... | ... | ... | 26     | —        |
| Constipation                         | ... | ... | ... | ... | ... | ... | ... | 34     | —        |
| Colic                                | ... | ... | ... | ... | ... | ... | ... | 11     | —        |
| Organs of Locomotion :—Fibrositis    | ... | ... | ... | ... | ... | ... | ... | 69     | —        |
| Connective Tissue :—Cellulitis       | ... | ... | ... | ... | ... | ... | ... | 57     | —        |
| Abscess                              | ... | ... | ... | ... | ... | ... | ... | 18     | —        |
| Diseases of the Skin :—Urticaria     | ... | ... | ... | ... | ... | ... | ... | 1      | —        |
| Eczema                               | ... | ... | ... | ... | ... | ... | ... | 3      | —        |
| Herpes                               | ... | ... | ... | ... | ... | ... | ... | 3      | —        |
| Tinea                                | ... | ... | ... | ... | ... | ... | ... | 34     | —        |
| Scabies                              | ... | ... | ... | ... | ... | ... | ... | 20     | —        |
| Prickly Heat                         | ... | ... | ... | ... | ... | ... | ... | 1      | —        |
| Lichen                               | ... | ... | ... | ... | ... | ... | ... | 1      | —        |
| Ulcers                               | ... | ... | ... | ... | ... | ... | ... | 12     | —        |
| INJURIES.                            |     |     |     |     |     |     |     |        |          |
| Local                                | ... | ... | ... | ... | ... | ... | ... | 396    | —        |
| ANIMAL PARASITES.                    |     |     |     |     |     |     |     |        |          |
| Bilharziasis                         | ... | ... | ... | ... | ... | ... | ... | 1      | —        |
| Total                                |     |     |     |     |     |     |     | 1,005  | —        |

FORT JOHNSTON DISPENSARY.

| Diseases.                         | Males. | Females. |
|-----------------------------------|--------|----------|
| INFECTIVE DISEASES.               |        |          |
| Dysentery ... ..                  | 3      | —        |
| Gonorrhœa ... ..                  | 5      | 1        |
| Leprosy :—Anæsthetic ... ..       | 1      | —        |
| Malaria :—Aestivo-autumnal ... .. | 49     | 1        |
| Black-water ... ..                | 1      | —        |
| Tick Fever ... ..                 | 4      | —        |
| Septicæmia ... ..                 | 1      | —        |
| Syphilis :—Secondary ... ..       | 16     | 1        |
| Tertiary ... ..                   | 1      | —        |
| <i>Carried forward</i> ... ..     | 81     | 3        |



TABLE VII.—OUT-PATIENTS.—*continued.*

## FORT MANGOCHÉ DISPENSARY.

| Diseases.                                   | Males. | Females. |
|---------------------------------------------|--------|----------|
| INFECTIVE DISEASES.                         |        |          |
| Dysentery ... ..                            | 5      | —        |
| Gonorrhœa ... ..                            | 2      | —        |
| Malaria :—Tertian ... ..                    | 6      | 2        |
| Pneumonia ... ..                            | 2      | —        |
| Syphilis :—Primary ... ..                   | 1      | —        |
| LOCAL DISEASES.                             |        |          |
| Nervous System :—Neuralgia ... ..           | 1      | —        |
| Headache ... ..                             | 7      | —        |
| Diseases of the Eye :—Conjunctivitis ... .. | 11     | 3        |
| Disease of the Ear :—Inflammation ... ..    | 1      | —        |
| Other Diseases ... ..                       | —      | 1        |
| Respiratory System :—Bronchitis ... ..      | 29     | 8        |
| Coryza ... ..                               | 11     | 1        |
| Pleurisy ... ..                             | 2      | —        |
| Digestive System :—Colitis ... ..           | 8      | —        |
| Diarrhœa ... ..                             | 5      | 2        |
| Constipation ... ..                         | 11     | 1        |
| Colic ... ..                                | 13     | 5        |
| Gingivitis ... ..                           | 1      | 1        |
| Generative System :—Delayed Labour ... ..   | —      | 1        |
| Organs of Locomotion :—Myalgia ... ..       | 18     | 1        |
| Connective Tissue :—Cellulitis ... ..       | 1      | —        |
| Diseases of the Skin :—Eczema ... ..        | 2      | —        |
| Boil ... ..                                 | 5      | —        |
| Psoriasis ... ..                            | 5      | —        |
| Tinea ... ..                                | 11     | 2        |
| Scabies ... ..                              | 38     | 11       |
| Fissures of Feet ... ..                     | 54     | 10       |
| Ulcers ... ..                               | 10     | —        |
| Total ... ..                                | 260    | 49       |

## KOTA KOTA DISPENSARY.

| Diseases.                                  | Males. | Females. |
|--------------------------------------------|--------|----------|
| INFECTIVE DISEASES.                        |        |          |
| Dysentery ... ..                           | 3      | 2        |
| Gonorrhœa ... ..                           | 13     | 3        |
| Leprosy :—Nodular ... ..                   | 14     | 1        |
| Malaria :—Tertian ... ..                   | 21     | 13       |
| Aestivo-autumnal ... ..                    | 47     | 16       |
| Pneumonia ... ..                           | 15     | 3        |
| Tick Fever ... ..                          | 7      | 2        |
| Trypanosomiasis (Sleeping Sickness) ... .. | 5      | 6        |
| Syphilis :—Primary ... ..                  | 3      | 1        |
| Secondary ... ..                           | 7      | 3        |
| Tuberculosis ... ..                        | 5      | 2        |
| Yaws ... ..                                | 11     | 1        |
| <i>Carried forward</i> ... ..              | 151    | 53       |



TABLE VII.—OUT-PATIENTS.—*continued.*KARONGA DISPENSARY.—*continued.*

| Diseases.                                                 | Males. | Females. |
|-----------------------------------------------------------|--------|----------|
| <i>Brought forward</i> ... ..                             | 35     | —        |
| INFECTIVE DISEASES.— <i>continued.</i>                    |        |          |
| Malaria :—Tertian ... ..                                  | 7      | 2        |
| Aestivo-autumnal ... ..                                   | 82     | 8        |
| Pneumonia ... ..                                          | 6      | —        |
| Septicæmia ... ..                                         | 1      | —        |
| Syphilis :—Primary ... ..                                 | 8      | —        |
| Tetanus ... ..                                            | 1      | —        |
| Tuberculosis ... ..                                       | 1      | —        |
| Whooping Cough ... ..                                     | 3      | 1        |
| Yaws ... ..                                               | 11     | 2        |
| GENERAL DISEASES.                                         |        |          |
| Anæmia ... ..                                             | 2      | 1        |
| LOCAL DISEASES.                                           |        |          |
| Nervous System :—Paralysis ... ..                         | 1      | —        |
| Epilepsy ... ..                                           | 2      | —        |
| Neuralgia ... ..                                          | 2      | —        |
| Mental Diseases :—Delusional Insanity ... ..              | 1      | —        |
| Diseases of the Eye :—Conjunctivitis ... ..               | 14     | 3        |
| Keratitis ... ..                                          | 11     | 2        |
| Ulceration of Cornea ... ..                               | 4      | —        |
| Diseases of the Ear :—Inflammation ... ..                 | 19     | 1        |
| Other Diseases ... ..                                     | 5      | —        |
| Diseases of the Nose :—Coryza ... ..                      | 84     | —        |
| Circulatory System :—Myocarditis ... ..                   | 1      | —        |
| Respiratory System :—Laryngitis ... ..                    | 2      | —        |
| Bronchitis ... ..                                         | 12     | 1        |
| Pleurisy ... ..                                           | 5      | 1        |
| Asthma ... ..                                             | 1      | —        |
| Digestive System :—Stomatitis ... ..                      | 6      | 4        |
| Caries of Teeth ... ..                                    | 10     | 1        |
| Sore Throat ... ..                                        | 1      | —        |
| Dyspepsia ... ..                                          | 15     | —        |
| Ulceration of Intestines ... ..                           | 5      | —        |
| Hernia ... ..                                             | 1      | —        |
| Diarrhœa ... ..                                           | 90     | 3        |
| Constipation ... ..                                       | 44     | —        |
| Colic ... ..                                              | 5      | —        |
| Hepatitis—Acute ... ..                                    | 2      | —        |
| Lymphatic System :—Inflammation of Lymphatic Gland ... .. | 2      | —        |
| Urinary System :—Cystitis ... ..                          | 1      | —        |
| Generative System :—Hydrocele ... ..                      | 2      | —        |
| Orchitis ... ..                                           | 1      | —        |
| Organs of Locomotion :—Arthritis ... ..                   | 3      | —        |
| Fibrositis ... ..                                         | 16     | —        |
| Connective Tissue :—Abscess ... ..                        | 2      | —        |
| Diseases of the Skin :—Eczema ... ..                      | 20     | 2        |
| Boil ... ..                                               | 4      | —        |
| Tinea ... ..                                              | 79     | 1        |
| Scabies ... ..                                            | 8      | 4        |
| Ulcers ... ..                                             | 73     | 7        |
| <i>Carried forward</i> ... ..                             | 711    | 44       |

TABLE VII.—OUT-PATIENTS.—*continued.*

KARONGA DISPENSARY.—*continued.*

| Diseases.                          |                 |         |     |     |     |     |     | Males. | Females. |
|------------------------------------|-----------------|---------|-----|-----|-----|-----|-----|--------|----------|
| <i>Brought forward</i> ... ..      |                 |         |     |     |     |     |     | 711    | 44       |
| LOCAL DISEASES.— <i>continued.</i> |                 |         |     |     |     |     |     |        |          |
| INJURIES.                          |                 |         |     |     |     |     |     |        |          |
| Local                              | ...             | ...     | ... | ... | ... | ... | ... | 283    | 3        |
| TUMOURS.                           |                 |         |     |     |     |     |     |        |          |
| Carcinoma                          | ...             | ...     | ... | ... | ... | ... | ... | —      | 1        |
| POISONS.                           |                 |         |     |     |     |     |     |        |          |
| Snake Bite                         | ...             | ...     | ... | ... | ... | ... | ... | 4      | 1        |
| ANIMAL PARASITES.                  |                 |         |     |     |     |     |     |        |          |
| Bilharziasis                       | (Intestinal)    | ...     | ... | ... | ... | ... | ... | 240    | 4        |
| „                                  | (Urinary)       | ...     | ... | ... | ... | ... | ... | 11     | —        |
| Nematoda :—                        | Ascaris         | ...     | ... | ... | ... | ... | ... | 79     | 7        |
|                                    | Tricocephalus   | Dispar. | ... | ... | ... | ... | ... | 5      | —        |
|                                    | Filariasis      | ...     | ... | ... | ... | ... | ... | 2      | —        |
|                                    | Strongylus      | ...     | ... | ... | ... | ... | ... | 4      | —        |
|                                    | Ankylostomiasis | ...     | ... | ... | ... | ... | ... | 607    | 35       |
|                                    | Oxyuris         | ...     | ... | ... | ... | ... | ... | 1      | —        |
| Total                              |                 |         |     |     |     |     |     | 1,947  | 95       |

CENTRAL LUNATIC ASYLUM, ZOMBA.

| Type of Insanity. | Remaining<br>in Asylum<br>at end of<br>1912. | Yearly Total. |         | Total<br>Cases<br>Treated | Remaining<br>in Asylum<br>at end of<br>1913. | Remarks.          |
|-------------------|----------------------------------------------|---------------|---------|---------------------------|----------------------------------------------|-------------------|
|                   |                                              | Admissions.   | Deaths. |                           |                                              |                   |
| Mania             | 7                                            | 3             | —       | 10                        | 10                                           | 1 Female.         |
| Melancholia       | 3                                            | 1             | —       | 4                         | 4                                            |                   |
| Delusional        | 4                                            | —             | —       | 4                         | 4                                            |                   |
| Circular          | 1                                            | —             | —       | 1                         | 1                                            | Died of pneumonia |
| Epileptic         | 1                                            | —             | 1       | 1                         | —                                            |                   |
| Dementia          | 3                                            | —             | —       | 3                         | 3                                            |                   |

## SECTION VI.—SCIENTIFIC.

---

The following Papers are appended :—

1. ACROMEGALY, a case of. By Dr. J. B. Davey, Medical Officer, Mlanje.
  2. ANKYLOSTOMIASIS in the North Nyasa district. By Dr. A. G. Eldred. Medical Officer, Karonga.
  3. FILARIASIS in the Ruvo District. By Dr. Sanderson, Medical Officer, Chiromo.
  4. HELMINTHIC INFECTIONS at Mtumbolende, in the Ruvo district. By Dr. G. M. Sanderson, Medical Officer, Chiromo.
  5. MALARIAL DYSENTERY, notes on a case of. By Dr. A. H. Barclay, Medical Officer, Blantyre.
  6. OBSERVATIONS ON MEDICAL MATTERS in the Dedza District. By Dr. J. B. Davey, S. S. I., Dedza.
  7. PELLAGRA in the Zomba Central Prison. By Dr. H. S. Stannus, Medical Officer, Zomba.
  8. SLEEPING SICKNESS INVESTIGATIONS during the year 1913, a brief review of. By the Principal Medical Officer.
- 

### NOTES ON A CASE OF ACROMEGALY, BY J. B. DAVEY, MEDICAL OFFICER, MLANJE.

The patient belonged to the Achewa tribe and came from Kota Kota, but was seen in an adjoining district; he was a man of about 26 years of age and stated that all his relations are of normal size, that he has two wives, by one of whom he has two children, aged about one and two years respectively: the younger child was seen and presented no abnormality save an internal strabismus. The second wife, who is younger than the other, is childless; he has been married to her for about three years.

The patient further stated that he had grown to his present gigantic size during the last three years, but a missionary informed me that he had known the man for more than three years and that during this time he had not observed any change in him. The lower jaw and lower part of the face are prominent and massive, the voice thick and harsh, speech deliberate. The hair on the head and the eyebrows is normal, but there is an unusually abundant growth of coarse hair on the upper part of the chest and the shoulders. The gait is laboured and somewhat waddling. The hands and feet, especially the latter, are enormous and the fingers are in proportion. There is slight kyphosis. The lines on the palms are simple and few. Cerebration is slow and the face expressionless. There is no exophthalmos. The skin is coarse and dry. He is said to be sensitive about his size but allowed examination and photography without demur; the photographs, unfortunately, were unsatisfactory.

*Measurements.*—Height 6 feet 6 $\frac{3}{4}$  inches.

Tip of acromion to tip of right middle finger 38 $\frac{1}{2}$  inches.

Circumference of forearm (R) 13 $\frac{1}{2}$  inches.

" " arm (R) 14 $\frac{1}{2}$  inches (forearm extended); 15 $\frac{1}{2}$  inches (forearm flexed).

Hand, from crease at wrist to tip of middle finger (R) 9 $\frac{1}{2}$  inches.

Inner side of foot (L) from heel to tip of great toe 13 inches.

Calf circumference (R) 16 $\frac{1}{2}$  inches.

*Remarks.*—The case seems to be clearly one of acromegaly, and on account of the rarity of that disease is considered worth recording. The age of onset is uncertain.

The height of the patient is remarkable, more especially in a native of Nyasaland, amongst whom a height of 6 feet is exceptional. The muscular development is poor; the growth of hair on the chest and shoulders is noteworthy, for this I believe to be less frequent in natives than in Europeans.

ANKYLOSTOMIASIS IN THE NORTH NYASA DISTRICT,  
BY A. G. ELDRED, MEDICAL OFFICER, KARONGA.

During the latter part of year 1911 a severe case of Ankylostomiasis was reported from Vua, in the North Nyasa district. This particular helminth had previously been recorded in various parts of Nyasaland, but there were no general statistics of the percentage of natives infected.

In view of the fact that Vua was expected to become the centre of the cotton growing industry in the North Nyasa district, and that Ankylostomiasis might prove to be the reason for the difficulty in obtaining efficient local labour, it was decided to investigate the matter more thoroughly.

During the few weeks that I was stationed in Karonga, early in 1912, there was no time for a thorough investigation, but the cases I found then led me to suggest that the infection was not limited to Vua, and that probably a systematic examination of the general population would shew a large proportion to be infected. A Report by the Medical Officer of Karonga in 1912 (Dr. Conran) shewed that at least 41% of the population were infected.

It was decided to continue the investigation, and to enforce such prophylactic measures as were practicable. A total of 1,500 natives have been examined during the past seven months, all infected individuals given treatment one or more times, and such prophylactic measures as were practicable and possible, under existing conditions, carried out.

DESCRIPTION OF DISTRICT.

A.—PHYSICAL.

North Nyasa consists of two distinct portions: (1) A narrow strip of almost entirely flat country at the lake level (1,500 ft.), about 10 miles in width and 70 miles long, bounded on the east by the lake, and on the west by the mountain.

Directly on the lake shore, and for a mile or two inland, there are numerous villages, but as the hills are approached the population becomes scanty, except near the larger rivers. Along the lake shore, and often for half a mile or more inland, the soil consists of pure sand, and more inland of more or less sandy earth. On this sand or sandy earth the majority of the villages are built. There are numerous rivers and streams, but all except four or five are dry in this area for at least nine months in the year.

There is no thick forest, but a profusion of small trees and scrub, scattered about on the grassy plains. In and around the villages are thick banana groves.

During the rainy season (December—April) this flat country is in many places waterlogged, and during this period the population in such areas move a short distance away to some slightly higher and drier spot, returning to the original site after the rains. The people derive their water supply from either the lake, the rivers, or from water holes and wells.

(2). A mountainous portion, composing the remainder of the district, thinly populated, well wooded in many places, and with a soil consisting largely of coarse gravel.

The percentage of ankylostome infection has been shewn by Dr. Conran to be highest in the lake level area.

B.—INHABITANTS.

The great bulk of the population at the lake level consists of Ankonde or allied people. There are also settlements of Henga, a hill tribe; of Awemba, originally from Rhodesia; and some so-called Swahili. The principal hill tribes are the Henga, in the southern portion of the district; the Poka, on the Nyika Plateau; and the Misuku, in the north-west portion. The Ankonde, the original inhabitants of the lake level area, are a peaceful, cattle-breeding race; their one purpose in life appears to be the well-being of these cattle. Their food consists principally of sour milk and bananas, possibly a valuable diet in an emergency, but, as staple articles of food, not calculated to produce a race of virile workers.

There appears to be no doubt that the Ankonde are inferior to the Ahenga, Awemba or Swahili as workers; and it was thought that ankylostome infection might be the reason for this.

#### C.—(1). PROCEDURE ADOPTED.

It has been shewn that the usual route of infection in Hook-worm disease is through the skin, infection being acquired by walking over infected ground containing embryos which have developed from the ova voided with the faeces.

It is therefore evident that any campaign against such a disease, to be permanently successful, must be very thoroughly carried out; treatment of a small percentage of the infected individuals in one locality, though temporarily benefiting a few, will not go far towards eradicating the disease in the community, nor is treatment of much avail unless very efficient sanitary precautions are taken by the people generally; for if these are neglected, reinfection will almost certainly take place, the condition of things becomes as bad as before, and time and money have only been wasted. Consequently, the only efficient way to deal with the question is to systematically work through each village, examining every individual in it, treating the infected ones and at the same time establishing proper latrines, and sanitary reforms generally in these villages.

With this object in view the following action has been taken:—

(a) The Chiefs and Headmen of the various villages have been called in before the Resident and Medical Officer, and the nature of the disease and the preventive measures to be adopted explained to them. They have been shewn the type of latrine that should be adopted.

(b) A systematic examination of every individual in the surrounding villages is being carried out.

(c) Printed notices in the Wankonde and Ahenga languages, explaining in simple terms the nature of the disease, and the precautions to be adopted, are now being printed, and will be circulated as soon as ready.

#### (2). DIFFICULTIES IN THE WAY OF AFFECTING A RAPID IMPROVEMENT OVER A LARGE AREA.

It has, I understand, been suggested that a 25-mile radius from Karonga should be taken, and this area dealt with first. I should like to take this opportunity of pointing out a few of the difficulties that are to be encountered in dealing with such a disease as ankylostomiasis in a native population, and without a large staff of workers, and especially in such a district as this, where the population is extremely scattered, and where, owing to this and to the nature of the district, travelling takes up a large amount of time.

These difficulties are caused by:—

#### (3). TIME INVOLVED IN DIAGNOSIS AND TREATMENT.

The Diagnosis and Treatment of Ankylostomiasis necessitate the following procedure:—

(a). A microscopic examination of the faeces for ova.

(b). A clinical examination of infected individuals.

(c). Anthelmintic treatment of these individuals.

To be thorough re-examination, and, if necessary, further treatment should be undergone in a week or two.

In regard to (a). I am at the present time examining slides at the rate of 20—24 per diem, and find that this is the maximum average that can be maintained by one worker if each slide is thoroughly examined and when various other duties are included such as the clinical examination and treatment of the infected individuals, and inspection of villages.

As the sphere of action widens, the time taken up in travelling and inspecting will probably lower the above average, but assuming that one worker could continue to examine slides at the rate of 400—500 a month, and the population of the whole of North Nyasa being over 38,000, we get the following results:—One would take over seven years to complete the examination of the whole district; and over three and a half years to complete the examination of the inhabitants of the 25-mile radius where the population is estimated at nearly 19,000.

(b). Is merely a question of time involved, but is advisable.

(c). Is important for the following reasons:—

The curative treatment of Hook-worm disease does not consist in merely handing out a dose of medicine to each individual who is infected, but requires four separate administrations of two or more rather unpleasant and, in some cases, dangerous drugs; during which period of administration it is necessary that no food, very little liquid, and in the case of Thymol or Beta Naphthol no alcohol should be taken.

Moreover a large proportion of the infected individuals only complain of minor symptoms, and many deny having any symptoms at all; consequently it is probable that they will seldom follow out the above treatment, except under supervision.

An alternative method of treatment would be to dispense with the microscopic examination and to dose every individual who complained of symptoms that might be due to ankylostomiasis. This could be fairly rapidly done by training several natives in the prominent symptoms to be sought for, and in the method of administering the Anthelmintic; such a haphazard course is open to obvious objections, and many cases would be missed.

#### (4). THE EXISTING TYPE OF VILLAGE.

The main population of North Nyasa is not contained in a series of large villages or towns; but scattered over the 4,000 odd square miles which comprise the District are a multitude of tiny settlements, often consisting of only a hut or two, separated from neighbouring ones by several hundred yards, while possibly 60, 80, or more of these huts go to make up one of these so-called "villages." There are of course a certain number of large and compact villages, but these are in the minority.

As long as these villages remain as they are it will not be possible to establish a satisfactory system of public-trench latrines, for it is certain that in such a scattered community they would not be used by the majority and the present alternative is a latrine for almost every house; rendering the work of inspection much more difficult, and the probabilities of the ground near the huts becoming infected much greater.

#### (5). AREAS DEALT WITH.

In view of these facts, the following procedure has been adopted:—

(1). A small area has been taken in hand, with the object of thoroughly dealing with it. This area consists of a strip extending inland from Karonga for about 10 or 12 miles north, and for about 20 miles south. This strip contains roughly 14,000 people, in an area of 400 square miles; or 35 inhabitants to the square mile; whereas a 25-mile radius from Karonga contains about 19,000 people, in an area of 1,000 square miles; or only 19 inhabitants to the square mile. In this way, small areas can be fairly satisfactorily dealt with, and, at the end of a year, re-examination would shew whether sufficient improvement had resulted to justify a campaign on a large scale.

#### D.—CURATIVE MEASURES.

Practically all the people in the immediate vicinity of Karonga have now been examined and treated, and also as many cases as possible in the area mentioned under C. Stray cases in the Dispensary, and such as have been found while inspecting the district, have also been treated. All infected individuals have been given one course of treatment, either with B. Naphthol or Eucalyptus oil. It was obviously impossible to re-examine every case, but from nearly 100 cases that I was able to re-examine it is evident that one course of treatment is frequently inadequate. (See Table IX).

Very little desire is shewn by these people to come up for treatment, and in most cases they refuse to accept re-treatment, their symptoms being slight or nil, but in order to try and induce them to do so a ticket has been given to every case of Ankylostomiasis found and the recipient informed that on presenting this ticket at the Karonga Dispensary free treatment is available. It is possible that in this way any cases which at some future date may develop severe symptoms may be got hold of and cured. As has already been shewn it would take years to examine the whole population for Ankylostomes.

#### E.—PREVENTIVE MEASURES.

These have been conducted on the lines detailed under C. (a) and (c).

Notices have been sent to all the Chiefs and Headmen in the area, and to a great number in the rest of the district.

I have inspected a large portion of the district and it is now possible to say that, in the 10 by 40 mile area, in every village of any size, latrines have been built, and are at present being used, and the sanitary condition of the villages is in general better. As several people have said, it is now possible to camp *outside* a village on sites that were before impossible owing to the insanitary and promiscuous habits of the inhabitants.

In the Henga Valley, and in other parts of the hill district, the latrines either had been built, or were built before I left the village, but opportunities for the inspection of villages 100 miles or more away are naturally rather rare.

With regard to the type of latrine that has been adopted, not only is the shallow trench latrine not advisable but it is very difficult to induce the native to adopt any form of public latrine, nor are the villages at present adapted to such a thing. Consequently, nearly every family has its own little private latrine, a pit about 4—6 feet deep, with a thatched roof. Until the villages are concentrated it will be advisable to allow these private latrines to be used, but with a properly planned-out native village the best arrangement would be one or more deep trench latrines for each village according to requirements.

The Village Ordinance of 1912 is now applied to the North Nyasa District, and this will certainly render it easier to insist on sanitary measures being adopted.

#### RESULT OF INVESTIGATIONS.

*(To be read in conjunction with the Tables).*

*Tables I and II.*—The 1,500 people examined were of all ages and both sexes, from all parts of the lake level area and from a portion of the hill area. The primary object of the investigation was the finding of ankylostomiasis, and as a rule other helminths were merely noted when seen; consequently, as will be observed by reference to Dr. Conran's Report, the actual percentage of other helminths therein noted is higher than appears in these Tables.

In certain villages, to be enumerated later, the correct Bilharzia percentage was taken, and the Bilharzia percentages given in Table VI are correct. Strongyloides are not included, as in many cases by the time the specimens were examined the stools were from 3 to 6 hours old, and though rhabdite embryos were sometimes seen it was always in association with ankylostome ova; so it is possible that these embryos were those of ankylostomes. Tricocephalus appears to be most prevalent in the north-east part of the district, in the Songwe River area; and a very large number of the cases of Ascaris infection were also found in this part (32% in one village). The Songwe is the rice growing area.

*Table III.*—Villages 1, 2, 3, and 13 are built almost directly on the lake shore, 4—9 and 12 are from one to three miles inland, 10 is about 6 miles inland in the marshy country near the Songwe River, and 11 are villages about 8 miles inland near the foot hills. The Henga Valley is in the southern part of the district at an elevation of about 3,000 feet. The Bilharzia percentage is correct for numbers 1, 3, 4, 5, 7, 8, and 12.

*Table IV.*—With the exception of the hill Henga, the tribes mentioned were living at the lake level. The relatively low percentage in the Ahenga living at lake level is in part due to the comparatively small number examined, and the fact that they lived in an area where the percentage for other villages was low.

*Table V.*—This shews the liability to infection at various periods of life. Owing to the usual route of infection, through the skin of the feet or legs, it is only natural that in actual infancy (i.e. before the child can walk) the percentage of infections should be low. Once infancy is passed the age of the individual has very little influence on the liability to infection, and the same holds good in regard to sex.

*Table VI.*—The soil of the lake level area is, in and around most villages, either pure (in the geological, not the sanitary sense) sand, or sandy earth, as already mentioned. Now the percentage for villages in general directly on the lake shore is 40%, and for villages a mile or so inland is 48%, so that at first sight it would appear that soil and water do, in the lake area, influence the percentage slightly. But on reference to Table III we find villages Nos. 1 and 3 both built on exactly similar sites, directly on the lake shore and on sand, with such widely different percentages as 56% and 27%. It would appear that soil and water supply have not much bearing, one way or the other, at the lake level. It is probable that the lower percentage in the hills is due in some degree to the totally different nature of the soil.

*Table VII.*—Is an analysis of the symptoms usually met with. The various symptoms enumerated were found to occur either singly or two or more in conjunction.

*Gastro-intestinal.*—Including pigmentation of or purple streaks on the tongue, colic, epigastric pain, diarrhœa. The changes in the tongue were found just as commonly in the uninfected native. Diarrhœa, when complained of, was said to take an intermittent form, lasting a few days, and then disappearing for weeks or months.

*Dysenteric.*—In most instances, when blood was actually found in a specimen, in a case of Ankylostomiasis, *Bilharzia* ova were present.

*Circulatory.*—Irregular action of the heart, palpitation, hæmic murmurs, and in some cases evident organic lesions, the latter probably not associated in any way with the presence of Ankylostomes. Dilatation of the heart was very seldom seen.

*Joint Pains.*—The pain in the sternum, mentioned by various writers, was sometimes complained of; and often rheumatic pains in various joints. Joint pains are however, so often complained of in uninfected natives that this symptom is not regarded as possessing much value.

*Anæmia.*—There were no facilities for obtaining the true hæmoglobin percentage in these cases, and only a rough and ready test of anæmia, by examining the conjunctiva, could be applied. In a great number of cases all symptoms were denied, and the only sign of departure from normal that could be attributed to ankylostome infection was a mild degree of anæmia.

#### OTHER SYMPTOMS, NOT INCLUDED IN TABLE VII.

*Ground Itch.*—No reliance can be placed in any past history of this in a native, who suffers from so many lesions of the skin of the feet and legs; no typical ground-itch rash was ever seen in a native, though in the case of a European the presence of the typical rash on the ankles gave the clue to the disease.

*Earth-eating, or Geophagy.*—A small percentage of both infected and uninfected acknowledged to this practice, and it is probably quite a common one in fact though often denied. It does not appear to be a regular or constant practice, and probably bears very little, if any, relation to ankylostome infection.

*Signs of severe infection, general œdema, extreme anæmia, muscular wasting, etc.*—Very few really severe cases were seen, and no cases of arrested or retarded development were observed. All the cases seen during the last six months are being kept sight of as far as possible, and up to now only one is recorded as having died, a boy of about 8 with extreme anæmia, chronic diarrhœa, and œdema. He also had chronic malaria.

*Examination of Specimens.*—The number of ova found was almost always small, often only one in the whole slide, and very seldom more than four or five. The number did not appear to bear any relation to the severity or otherwise of the symptoms. The specimens were examined by direct admixture with water, as time did not permit of the centrifugal or other methods being employed.

*Table VIII.*—From June to the middle of December the rainfall is practically nil in this district, consequently one would expect, as is the case, very little variation in the percentage during these months.

*Table IX.*—Has already been discussed under Curative Measures.

*Table X.*—Explanation of terms:—

*Carriers.*—Individuals, usually of good physique (for the native of this country), denying illness, and apparently in good health, and either shewing no symptoms due to ankylostome infection or at most a mild degree of anæmia.

*Mild Cases.*—Of good or fair physique, in some cases anæmic and shewing in a mild degree one or more of the symptoms detailed in Table VII.

*Moderate Cases.*—Accentuation of the symptoms found in the “mild” cases, and including cases shewing evidence of circulatory changes, and obvious bad health that might be due to ankylostome infection.

*Severe*—In which there is every probability of a fatal termination; with such symptoms as extreme anæmia, wasting, œdema, etc.

The remaining Tables will be considered in the concluding portion of the Report.

*Reasons for assuming that there is, in this part of the Protectorate, a racial immunity to the severe effects of ankylostome invasion, and that the lack of efficiency, as labourers, cannot in the Ankonde be ascribed to ankylostome infection.*—In clinically examining every day a number of natives whose faeces on microscopical examination had shewn ankylostome ova the mildness or even absence of symptoms and the remarkable rarity of severe cases soon became apparent, and made one wonder whether Ankylostomiasis was seriously affecting the health of these natives as a community, or even in the majority of cases as individuals; and also whether the inefficiency of the Ankonde as a worker could really be attributed to ankylostome infection.

It seemed advisable to attempt to settle the question, both to avoid disappointment in the possibly anticipated improvement in the working capacity of the Ankonde, and also because to deal thoroughly with ankylostomes in such a district and among such a community as this would be an exceedingly costly and lengthy undertaking. The method adopted has been to examine both infected and non-infected individuals, noting their general development, symptoms possibly caused by ankylostomes, other diseases, mode of life, surroundings, etc.

*Table XI.*—Is for adults, and shews the results of this comparison of infected and uninfected individuals. Under general development they have been divided into good, fair, and bad; good indicates good development and physique as represented by the native of this district, and not of Africa in general. No one, I imagine, would call the North Nyasa native a fine type, as compared with other tribes and races. Of course exceptionally fine men are seen from time to time; but as a general rule, both intellectually and physically, the type is anything but high.

Referring then to Table XI it is seen that, as far as general development is concerned, the presence of ankylostomes has no effect. Again, with anæmia, circulatory changes, and joint pains, just as many uninfected people shew these changes, and so many other diseases may produce these symptoms; for malaria, yaws, syphilis, leprosy, and a host of chronic ulcerations all exist in this district. The pigmented condition of the tongue is just as common in the uninfected native. The presence of ankylostomes evidently does affect the gastro-intestinal tract in these people, but here again it must be remembered that many of these cases are complicated by Bilharzia and that digestive troubles are very common in the uninfected native.

*Tables XII and XIII.*—It might be suggested that the children were the sufferers, as is the case with malaria in the native; and that, as adult life was approached, an immunity to the severe effects of ankylostome infection was established.

Table XII shews that this can hardly be the case, and that malaria, the great factor of ill-health in native children, has also to be taken into account. Now, enlargement of the spleen, in children especially, may fairly be ascribed to malaria, as Ankylostomiasis produces no special changes in the spleen and malaria causes anæmia.

*Table XIII* shews the spleen and anæmia-rate in infected children; the deduction being that 59% of children with ankylostomes are also infected with malaria, 21% are normal, and the remaining 20% are suffering from a certain degree of anæmia, probably not due to malaria, and possibly due to ankylostome infection.

#### OTHER FACTS.

As has been said, the average type of native here is not particularly well developed, but occasionally exceptionally fine men, comparing favourably with the best type of African one could pick out, are seen. Such men, on being examined, have in most cases been found to be harbouring ankylostomes, and it certainly could not be said that their health was affected.

Thirty carriers were taken on a journey of 300 miles, and the capability of each individual, as a worker, was noted. They were all examined for ankylostomes, and 50% of them were found to be infected; intestinal Bilharzia was found in 33%. The infected ones worked just as well, and appeared to have just as much stamina, as the uninfected. Five of these thirty men were decidedly better than any of the rest as workers, and three of the five had ankylostomes.

The percentage of infection is just as high in some other parts of the country. In the South Nyasa district, for example, it is 44%, and there is there, as far as I know, no complaint about the inefficiency of the native as a worker. With regard to the Ankonde reference to Table IV shews that the percentage of infections is no greater in them than in any other tribe. Moreover they are of no worse physique than the other local tribes, nor do they shew any more evidence of suffering from the effects of the infection.

The capabilities of the various tribes, as workers, in order of merit, and their staple diet, are shewn in the following Table.

| Tribe.  |     |     |     | Staple diet.                  |
|---------|-----|-----|-----|-------------------------------|
| Awemba  | ... | ... | ... | Maize, Cassava.               |
| Ahenga  | ... | ... | ... | Maize, Millet, Cassava.       |
| Swahili | ... | ... | ... | Rice, and occasionally Maize. |
| Ankonde | ... | ... | ... | Sour Milk, Bananas.           |

According to local employers of labour the Ankonde come a very bad last, as workers. It is evident that this cannot be due to ankylostomes, and it would appear to be a purely racial reason, not due in any way to disease. As has been suggested, food may be a possible factor. There is no special endemic area, but ankylostomes are found in over 60% (actual) of the inhabitants of the lake level area, irrespective of locality or tribe. The infection is no worse among the Ankonde than any other local tribe, and the inferiority of the Ankonde as workers cannot possibly be ascribed to ankylostome infection.

Of the infected individuals in this district, 31% shew no departure from health due to harbouring ankylostomes, and 27% only a mild degree of anæmia, that may or may not be due to ankylostome infection; that is to say, nearly 60% can fairly be classed as "Carriers." Another 37% have only mild symptoms, and, though it is probable that they have been harbouring ankylostomes for years, are not suffering any serious inconvenience on that account. Severe cases are extremely rare, for if existing in any number they must certainly have come to notice in examining such a large number of people.

To put it in another way, if 1,000 infected natives were examined 580 would be found to be unaffected by the presence of the parasite; 370 would hardly know that they were affected, owing to the mildness of their symptoms, 45 would complain of ill health (though it is possible that this ill health would in many cases be due to other causes); and 5 would be in a really bad state of health. In short, in spite of over 60% of them being hosts of this worm, very few seem much the worse for it. In other words, there is here a very high relative racial immunity.

However, there is no doubt that the native would be better without his ankylostomes, and though it does not appear to be necessary to enter upon a costly and extensive campaign, much may be done on the lines suggested by Dr. Conran in his Report. Therefore the aim should be to improve sanitary conditions on the lines already suggested, and to treat such cases as are obviously suffering from the effects of ankylostome infection; in this way it is possible that a gradual improvement will be effected; but to examine and treat all the people in this district who harbour ankylostomes would, unless about a dozen doctors or microscopists were employed, be a most lengthy business, and not of much value unless one could ensure that reinfection would not occur.

Before any real and permanent sanitary improvement can be effected, two things are necessary: concentration of the villages, and Sanitary Inspectors to see that the standard is maintained, that villages are built on proper lines, and that the latrines are maintained and used. These Inspectors are, I understand, to be supplied next year.

With regard to the concentration of villages, this is one of the most important points, and in every instance where new villages are contemplated the Chief or Headman should be required to notify the Resident, who, with the advice of the Medical Officer, would give instructions as to site, type of village, spacing of huts, water supply, etc. A definite set of rules for the planning out of new villages might well be drawn up.

The fact that a general exodus is unusual, the inhabitants of a village drifting away a few at a time, appears to be one reason for the scattered nature of the villages, and may prove one of the difficulties to be encountered in getting a better type of village adopted. The existing type has been described, and it is obvious that such a type can never be maintained in a sanitary condition unless the inhabitants are sanitary enthusiasts, which these certainly are not.

## TABLES.

Unless otherwise stated, percentages refer to Ankylostome infection.

“Infected” means Ankylostome ova found in the faeces on microscopical examination.

The percentages stated are the actual percentage in which Ankylostome ova were found, and 20% should be added for error.

The slight difference in the percentages under similar heads in Tables VII and XI is due to the fact that about 100 of the people examined, to compile Table VII, were not examined for Table XI.

TABLE I.

| Parasite.              | No. of people examined. | No. infected. | Percentage.           |
|------------------------|-------------------------|---------------|-----------------------|
| Ankylostome ... ..     | 1500                    | 550           | 44 Lake.<br>16 Hills. |
| Bilharzia ... ..       | V. note on p. 78        | 245           | 16                    |
| Ascaris ... ..         | do.                     | 91            | 6                     |
| Tricocephalus ... ..   | do.                     | 17            | 1                     |
| Total helminths ... .. | do.                     | 824           | 55                    |

TABLE II.

## SINGLE INFECTIONS.

| Ankylostome.   | Bilharzia.    | Ascaris.        | Tricocephalus. |
|----------------|---------------|-----------------|----------------|
| Per cent<br>32 | Per cent<br>8 | Per cent<br>1·7 | Per cent<br>·5 |

## DOUBLE INFECTIONS.

| Ankylostome,<br>Bilharzia. | Ankylostome,<br>Ascaris. | Ankylostome,<br>Tricocephalus. | Oxyuris,<br>Ascaris. | Bilharzia,<br>Ascaris. |
|----------------------------|--------------------------|--------------------------------|----------------------|------------------------|
| Per cent<br>7·2            | Per cent<br>3·3          | Per cent<br>2·6                | Per cent<br>·1       | Per cent<br>·3         |

## TRIPLE INFECTIONS.

| Ankylostome, Ascaris,<br>Bilharzia. | Ankylostome, Ascaris,<br>Tricocephalus. | Ankylostome, Bilharzia,<br>Tricocephalus. |
|-------------------------------------|-----------------------------------------|-------------------------------------------|
| Per cent<br>2·6                     | Per cent<br>·2                          | Per cent<br>·06                           |

TABLE III.

| Village.                    | Ankylostome percentage. | Bilharzia percentage. |
|-----------------------------|-------------------------|-----------------------|
|                             | Per cent.               | Per cent.             |
| 1. Mabuluki ... ..          | 56                      | 13                    |
| 2. Kasoti ... ..            | 37                      | 7                     |
| 3. Kaiyune ... ..           | 27                      | 11                    |
| 4. Kanyoli ... ..           | 37                      | 22                    |
| 5. Mwahimba ... ..          | 46                      | 25                    |
| 6. Mwawimbi ... ..          | 60                      | 8                     |
| 7. Mwanjawalo ... ..        | 39                      | 26                    |
| 8. Mwafilaso .. ...         | 33                      | 24                    |
| 9. Mwakasungula ... ..      | 37                      | 14                    |
| 10. Mwangulukulu ... ..     | 50                      | 6                     |
| 11. Mpata, Chungu, etc. ... | 40-60                   | 20                    |
| 12. Simapoma ... ..         | 40                      | 40                    |
| 13. Vua ... ..              | 37                      |                       |
| Henga Valley ... ..         | 24                      | 3                     |

TABLE IV.  
PERCENTAGE IN VARIOUS TRIBES.

| Ankonde.  | Awemba.   | Ahenga.   | Swahili.  | Nyachusa. | Hill Henga. |
|-----------|-----------|-----------|-----------|-----------|-------------|
| Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent.   |
| 38-60     | 60        | 37        | 56        | 50        | 24          |

TABLE V.

| Infancy.  | Childhood. | Adult life. | Old age.  |
|-----------|------------|-------------|-----------|
| Per cent. | Per cent.  | Per cent.   | Per cent. |
| 12 ... .. | 47         | 51          | 41        |

TABLE VI.

| Parasite.          | Percentage in relation to soil,<br>vegetation, etc. |                                    | Percentage in relation to<br>water supply. |           |                          |
|--------------------|-----------------------------------------------------|------------------------------------|--------------------------------------------|-----------|--------------------------|
|                    | Lake shore<br>villages.                             | Villages a mile<br>or more inland. | Lake.                                      | Rivers.   | Wells and<br>water holes |
|                    | Per cent.                                           | Per cent.                          | Per cent.                                  | Per cent. | Per cent.                |
| Ankylostome ... .. | 40                                                  | 48                                 | 40                                         | 45        | 53                       |
| Bilharzia ... ..   | 12                                                  | 27                                 | 12                                         | 28        | 35                       |

TABLE VII (Exclusive of children).

| Gastro-intestinal,<br>exclusive of dysen-<br>teric. | Dysenteric. | Circulatory. | Joint pains. | Anæmia and<br>one or more<br>of preceding<br>symptoms. | Anæmia<br>only. | Denying illness<br>and shewing no<br>symptoms to be<br>attributed to<br>Ankylostome in-<br>fection. |
|-----------------------------------------------------|-------------|--------------|--------------|--------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------|
| Per cent.                                           | Per cent.   | Per cent.    | Per cent.    | Per cent.                                              | Per cent.       | Per cent.                                                                                           |
| 18                                                  | 3·5         | 15           | 7·5          | 20                                                     | 27              | 31·5                                                                                                |

TABLE VIII.

| Month.           | Number examined. | Percentage infected. |
|------------------|------------------|----------------------|
|                  |                  | Per cent.            |
| June ... ..      | 192              | 40                   |
| July ... ..      | 456              | 52                   |
| August ... ..    | 312              | 53                   |
| September ... .. | 200              | 46                   |
| October ... ..   | 210              | 49                   |

TABLE IX.

|                                                       |                                                   |                                                                       |
|-------------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------|
|                                                       | After one course of treatment with Beta Naphthol. | After one course of treatment with Eucalyptus and Chloroform mixture. |
|                                                       | Per cent.                                         | Per cent.                                                             |
| Percentage still shewing ova on re-examination ... .. | 42                                                | 33                                                                    |

TABLE X.

| Carriers. | Mild cases. | Moderate cases. | Severe cases. |
|-----------|-------------|-----------------|---------------|
| Per cent. | Per cent.   | Per cent.       | Per cent.     |
| 58        | 37          | 4·5             | ·5            |

TABLE XI.

|                  | General development. |           |           | Percentage of individuals shewing one or more of the symptoms detailed below. |           |                        |                 |           |
|------------------|----------------------|-----------|-----------|-------------------------------------------------------------------------------|-----------|------------------------|-----------------|-----------|
|                  | Good.                | Fair.     | Bad.      | Cir-<br>culatory.                                                             | Anæmia.   | Gastro-<br>intestinal. | Joint<br>pains. | Tongue.   |
|                  | Per cent.            | Per cent. | Per cent. | Per cent.                                                                     | Per cent. | Per cent.              | Per cent.       | Per cent. |
| Infected ...     | 70                   | 28        | 1·5       | 17                                                                            | 34        | 20                     | 5               | 18        |
| Non-infected ... | 68                   | 31        | 1         | 18                                                                            | 37        | 11                     | 6               | 17        |

TABLE XII. (Children)

|                  | General development. |           |           | Percentage of children shewing one or more of the symptoms detailed below. |                        |                                                      |
|------------------|----------------------|-----------|-----------|----------------------------------------------------------------------------|------------------------|------------------------------------------------------|
|                  | Good.                | Fair.     | Bad.      | Circulatory.                                                               | Gastro-<br>intestinal. | Anæmia, with or<br>without enlargement<br>of spleen. |
|                  | Per cent.            | Per cent. | Per cent. | Per cent.                                                                  | Per cent.              | Per cent.                                            |
| Infected ...     | 64                   | 32        | 4         | 8                                                                          | 28                     | 58                                                   |
| Non-infected ... | 66                   | 32        | 2         | 4                                                                          | 12                     | 62                                                   |

TABLE XIII.

| Enlarged spleen and<br>anæmia | Enlarged spleen, no<br>anæmia. | Spleen normal,<br>anæmia. | Spleen normal, no anæmia. |
|-------------------------------|--------------------------------|---------------------------|---------------------------|
| Per cent.                     | Per cent.                      | Per cent.                 | Per cent.                 |
| 38                            | 21                             | 20                        | 21                        |

## ADDENDA.

## 1. HELMINTHIC DISEASE IN DOMESTIC ANIMALS.

As a matter of interest, various domestic animals have been examined, and helminths allied to the human ankylostome was found to exist in a large percentage.

*Sheep*.—Of 13 sheep from various parts of the district, ankylostome-like ova were found in 51%. These ova differed from the ova of the human Ankylostome as follows; slightly more ovoid, with a larger space between capsule and nucleus. Segmentation was further advanced than in the human Ankylostome.

*Cattle*.—Very similar ova found in 10% of ten cattle examined.

*Donkeys*.—Ova found in 80% of five donkeys examined. Mature worms, from a donkey, are nearly twice the size of the human Hookworm, but in essential details very similar. A drawing of the male caudal bursa is shewn in the illustrations.\* While there is no doubt that this helminth is a totally distinct variety from the human Hookworm, and no such ova were at any time found in humans examined here, at the same time it is reasonable to consider the possibility of humans becoming infected by it; for if such infection occurred, the difficulties of prophylaxis would, in view of the large number of cattle in this district, be enormously increased.

## 2. NOTES ON SOME OF THE PREVAILING DISEASES IN THE NORTH NYASA DISTRICT.

*Small-pox*.—No cases of small-pox have been seen, nor any outbreak reported. A good many cases of blindness ascribed to small-pox are seen, and one frequently sees natives, adults mostly, bearing the marks of small-pox. A Vaccinator is at work in the district, and the natives are keen on being vaccinated.

*Pneumonia*.—These natives appear able to bear a great deal of exposure without ill effects, but quickly succumb once they are attacked by pneumonia.

*Tetanus*.—One fatal case, in a woman: no history of previous injury or confinement.

*Leprosy*.—Several cases, mixed variety, mostly from the north end of the district.

*Malaria*.—Common. Anopheles mosquitoes are found in all low-lying parts of the district, and the nature of the country is most favourable for their production. The spleen rate for children under 12 is, for the district in general, 60%.

*Tick Fever*.—The tick, *O. moubata*, is found in the Henga valley; near Fort Hill; and probably occurs in other parts.

*Syphilis*.—Secondary and tertiary lesions are observed, but no case of primary sore has been seen, probably because the native does not appreciate the need for treatment. There are many forms of dubious ulcer that may be syphilitic, but a definite diagnosis is often difficult.

*Yaws*.—This disease is fairly common, and typical cases are seen, with definite primary and secondary stages. Iodide of potassium appears to be the most effective drug.

*Filariasis*.—Most of the cases seen have come from the Songwe River area.

*Eye diseases*.—A form of acute catarrhal conjunctivitis is very common here in November and December, and is probably infectious. Interstitial keratitis is often met with. Cataract is hardly ever seen.

*Ear*.—Otitis is very common in children, and is very possibly a mycosis in many instances.

*Digestive*.—A severe ulceration of the gums and mucous membrane of the mouth, leading to gangrene in some cases, is fairly frequent. A spirillum and various bacilli are found in the discharge. Various intestinal disturbances are of course common, and though in some cases evidently due to helminthic infection often bear no relation to this, and are probably due to the diet of the native and to drinking polluted water.

*Skin*.—Scabies and the various tinea are common; eczema, especially in children, and many varieties of ulcer, including *ulcus tropicum*, ulcerating yaws, specific ulcers, and ulcers due to neglected cuts and scratches.

---

\* Not printed.

3. BILHARZIA INFECTION.

This infection, in the intestinal form as a rule, is found in varying percentages all over the district, especially at the lake level, but unlike Ankylostomiasis it is obviously affected by the nature of the water-supply. This is clearly shewn in Table VI. Urinary Bilharzia was comparatively seldom seen.

An examination of the various water supplies, lake, wells, and rivers, failed to reveal anything in the nature of an intermediate host. Two or three varieties of lake and river fish on examination were also negative. An illustration is given of a helminthic parasite, found free or in the folds of the mucous membrane in the intestinal canal of fishes. The body cavity would appear to be one large ovary, and oviposition proceeds at a great rate when this parasite is placed in water, an enormous number of eggs being laid. The symptoms produced by rectal Bilharziosis are not as a rule severe in these natives. Dysenteric diarrhœa, of an intermittent form, is the usual symptom complained of, and in many cases they deny any symptoms. Here again it would appear that there is a relative racial immunity.

FILARIASIS IN THE RUO DISTRICT BY G. M. SANDERSON, MEDICAL OFFICER, CHIROMO.

348 natives, men and women, were examined, 131 of these being inhabitants of the hill districts (elevation about 2,500 feet) and the remainder of villages situated on the River Shire and Ruo (about 200 feet); no children were examined. No microfilaria was seen other than m.f. bancrofti. None of the subjects showed any signs of Elephantiasis, but otherwise they were chosen without discrimination, slides being taken from those who would consent to the operation.

It will be seen that parasites were found in 6 slides taken between 8 a.m. and 4.30 p.m.; but in each instance they were taken at a time near one of the extremes of this period, and the parasites were very few in number. As however, in three cases the attitude of the parasite was suggestive of m.f. loa, further slides were taken at noon, two from each subject. One m. filaria was then found in one slide, the others being negative. It is considered, therefore, that the parasite was m.f. bancrofti in these cases also. It is noteworthy that the percentage of infections was much higher among those at work. Since none of the subjects showed any signs of infection, this would seem to indicate that the parasite has some toxic effect.

The percentage of infection, also, was much higher in those villages situated near the rivers than in those away from them—60% in one of the former (40 persons being examined). The results may be tabulated as follows:—

I. *Natives living in the Plains* (about 200 ft). (1). Slides taken at night (after 8 p.m.).  
(a). Natives in villages.

|              | No. examined. | Positive. | Per cent. |
|--------------|---------------|-----------|-----------|
| Men ... ..   | 56            | 25        | 44.6      |
| Women ... .. | 51            | 25        | 49.0      |
| Total ... .. | 107           | 50        | 46.7      |

- (b). Police and their wives. 6 Men and 6 Women examined. All negative.  
 (c). Labourers.

|              | No. examined. | Positive. | Per cent. |
|--------------|---------------|-----------|-----------|
| Men ... ..   | 18            | 3         | 16·6      |
| Women ... .. | 14            | 2         | 14·28     |
| Total ... .. | 32            | 5         | 15·6      |

- (2). Slides taken during the day (between 8 a. m. and 4·30 p.m.). Natives in villages.

|              | No. examined. | Positive. | Per cent. |
|--------------|---------------|-----------|-----------|
| Men ... ..   | 27            | 2         | 7·4       |
| Women ... .. | 39            | 3         | 7·7       |
| Total ... .. | 66            | 5         | 7·57      |

## II. Natives living in villages situated in the hill (elevation about 2,500 feet).

- (1) Slides taken at night (after 8 p.m.).

|              | No. examined. | Positive. | Per cent. |
|--------------|---------------|-----------|-----------|
| Men ... ..   | 47            | 2         | 4·2       |
| Women ... .. | 36            | 1         | 2·7       |
| Total ... .. | 83            | 3         | 3·6       |

- (2) Slides taken during the day (between 8 a.m. and 4.30 p.m.).

|              | No. examined | Positive. | Per cent. |
|--------------|--------------|-----------|-----------|
| Men ... ..   | 24           | 1         | 4·1       |
| Women ... .. | 24           | 0         | 2·1       |
| Total ... .. | 48           | 1         | 2·1       |

HELMINTHIC INFECTIONS AT NTUMBOLENDE, IN THE RUO DISTRICT,  
BY G. M. SANDERSON, MEDICAL OFFICER, CHIROMO.

One hundred persons, of both sexes, have been examined and of these only four were found not to harbour one parasite or another, and these four were all women. Three parasites were found, viz :—*A. duodenale*, *Asc. lumbricoides*, and *S. mansoni*, the relative percentages being as follows :—

TABLE I.

*A. duodenale.*

| —     |     |     |     |     | No. examined. | Positive. | Per cent. |
|-------|-----|-----|-----|-----|---------------|-----------|-----------|
| Men   | ... | ... | ... | ... | 37            | 36        | 97·3      |
| Women | ... | ... | ... | ... | 40            | 34        | 85·0      |
| Boys  | ... | ... | ... | ... | 12            | 12        | 100·0     |
| Girls | ... | ... | ... | ... | 11            | 9         | 81·8      |
| Total |     |     |     |     | 100           | 91        | 91·0      |

*Ascaris lumbricoides.*

|       |     |     |     |     |     |    |      |
|-------|-----|-----|-----|-----|-----|----|------|
| Men   | ... | ... | ... | ... | 37  | 10 | 27·0 |
| Women | ... | ... | ... | ... | 40  | 17 | 42·5 |
| Boys  | ... | ... | ... | ... | 12  | 3  | 25·0 |
| Girls | ... | ... | ... | ... | 11  | 8  | 72·7 |
| Total |     |     |     |     | 100 | 38 | 38·0 |

*S. mansoni.*

|       |     |     |     |     | No. examined. | Positive. | Per cent. |
|-------|-----|-----|-----|-----|---------------|-----------|-----------|
| Men   | ... | ... | ... | ... | 37            | 7         | 18·9      |
| Women | ... | ... | ... | ... | 40            | 7         | 17·5      |
| Boys  | ... | ... | ... | ... | 12            | 3         | 25·0      |
| Girls | ... | ... | ... | ... | 11            | 2         | 18·18     |
| Total |     |     |     |     | 100           | 19        | 19·0      |

It is evident from this table that the percentage of natives harbouring *A. duodenale* (or *N. americanus*) is very high, but it does not necessarily follow that *Anchylostomiasis*, as a disease, is equally prevalent.

It is a fair assumption that the severity of the symptoms produced in the host is directly proportionate to the number of worms harboured, and further, that the number of eggs passed is directly proportionate to the number of worms. Hence the severity of the disease may be gauged by estimating the number of eggs being passed by the host. With this object in view the following method was adopted :—Several samples were taken from different parts of the stool to be examined, and these were thoroughly mixed with distilled water in a watch-glass, so as to make an ‘emulsion’ of the faecal matter, sufficient water being added to each specimen to make the consistency of the ‘emulsions’ as constant as possible. Cover-glass preparations were then made with this ‘emulsion’ and for all practical purposes a constant amount of faeces was examined in every slide. Not the least important characteristic of a preparation so made is that very little foreign matter, such as bulky pieces of vegetable, etc., is present so that the material is evenly distributed under the cover-glass, and eggs are very easily distinguished. No specimen of a stool was pronounced negative until two slides had been examined.

The results of the enumeration and mensuration of the eggs found are shown in detail in the subjoined Tables. The infections by *Anchylostoma* are classified under three heads:—Class I, where the number of eggs per slide (either the first or the second examined) was under five; Class II,—number of eggs over four and under ten; and Class III, over nine. The first class may be regarded as “carriers,” the second as “slightly affected,” and the third as “severely affected.”

The proportions of those infected are :—

|                                |     |     |     |              |
|--------------------------------|-----|-----|-----|--------------|
| Class I. “Carriers”            | ... | ... | ... | 68 per cent. |
| Class II. “Slightly affected”  | ... | ... | ... | 23 „         |
| Class III. “Severely affected” | ... | ... | ... | 9 „          |

Hence, since ninety-one per cent of the population was found to be infected, the relative incidence of the disease in the whole population would be :—

|                                |     |     |     |                |
|--------------------------------|-----|-----|-----|----------------|
| Class I. “Carriers”            | ... | ... | ... | 61·9 per cent. |
| Class II. “Slightly affected”  | ... | ... | ... | 20·9 „         |
| Class III. “Severely affected” | ... | ... | ... | 8·2 „          |

As no specimens of the actual worm were obtained, the infections by *A. duodenale* and *N. americanus* have been classed together. It is probable, however, that the larger eggs were those of *Necator*, and, since an arbitrary figure is required, it has been assumed that eggs over 70  $\mu$ . length belong to this genus. The infections can then be subdivided into three classes, *A. duodenale*, *N. americanus*, and mixed, classified according to the number of eggs per slide, and tabulated thus :—

| Infection.               | Class I. |    |    |    | Class II. |    |    |    | Class III. |    |    |    | Not counted. |    |    |    |
|--------------------------|----------|----|----|----|-----------|----|----|----|------------|----|----|----|--------------|----|----|----|
|                          | M.       | W. | B. | G. | M.        | W. | B. | G. | M.         | W. | B. | G. | M.           | W. | B. | G. |
| <i>A. duodenale</i> ..   | 11       | 10 | 4  | 3  | 4         | 1  | 0  | 0  | 0          | 1  | 3  | 0  | 1            | 6  | 1  | 1  |
| <i>N. americanus</i> ... | 9        | 4  | 0  | 4  | 2         | 1  | 0  | 1  | 0          | 1  | 0  | 0  | 3            | 3  | 1  | 0  |
| Mixed infection ...      | 3        | 0  | 2  | 0  | 3         | 4  | 1  | 0  | 0          | 3  | 0  | 0  | 0            | 0  | 0  | 0  |
| Total ...                | 23       | 14 | 6  | 7  | 9         | 6  | 1  | 1  | 0          | 5  | 3  | 0  | 4            | 9  | 2  | 1  |

#### *Ascaris lumbricoides.*

All details regarding this infection are given in the tables and call for no further remark. The very large infection in some of the slides, however, is noteworthy.

It should be mentioned that in adding water to the specimen in the manner described above, and in the subsequent manipulation, the shells of these eggs are usually broken, and in the majority of instances the egg is found to be nearly or quite colourless, the characteristic appearance being entirely lacking. The double outline of the inner envelope, and the absence of the characteristic segmentation, however, readily distinguishes it from the egg of *Anchylostoma*. Reference to the table will show that this infection appears to be much more prevalent among males, and also that it shows a certain tendency to locality.

#### *Schistosomum mansoni.*

A lateral spine was distinguished in almost all eggs seen, and it is considered probable that this is a constant feature. It is remarkable that in spite of the large size of this egg only two of those seen were required in making the preparation.

TABLE III.

|               | Names of Parasites.        | Men.                                     |     |   |      | Women.                                   |     |   |       | Boys.                                    |    |   |      | Girls.                                   |     |   |       | Total<br>all classes.                    |     |   |       |
|---------------|----------------------------|------------------------------------------|-----|---|------|------------------------------------------|-----|---|-------|------------------------------------------|----|---|------|------------------------------------------|-----|---|-------|------------------------------------------|-----|---|-------|
|               |                            | No. of slides examined.                  |     |   |      | No. of slides examined.                  |     |   |       | No. of slides examined.                  |    |   |      | No. of slides examined.                  |     |   |       | No. of slides examined.                  |     |   |       |
|               |                            | Max. No. of eggs per slide.              |     |   |      | Max. No. of eggs per slide.              |     |   |       | Max. No. of eggs per slide.              |    |   |      | Max. No. of eggs per slide.              |     |   |       | Max. No. of eggs per slide.              |     |   |       |
|               |                            | No. of slides in which eggs not counted. |     |   |      | No. of slides in which eggs not counted. |     |   |       | No. of slides in which eggs not counted. |    |   |      | No. of slides in which eggs not counted. |     |   |       | No. of slides in which eggs not counted. |     |   |       |
|               |                            | Average No. of eggs per slide.           |     |   |      | Average No. of eggs per slide.           |     |   |       | Average No. of eggs per slide.           |    |   |      | Average No. of eggs per slide.           |     |   |       | Average No. of eggs per slide.           |     |   |       |
| First slide.  | A. duo<br>&<br>N. ams      | 20                                       | 8   | 3 | 3.4  | 16                                       | 17  | 4 | 5.2   | 7                                        | 14 | 2 | 6    | 2                                        | 4   | 0 | 2.5   | 45                                       | 17  | 9 | 4.2   |
|               | Asc. 1                     | 1                                        | 47  | 0 | 47.0 | 1                                        | 150 | 0 | 150.0 | 0                                        |    |   |      | 1                                        | 103 | 0 | 103.0 | 3                                        | 150 | 0 | 100.0 |
|               | S. man                     | 1                                        | 1   | 0 | 1.0  | 1                                        | 1   | 0 | 1.0   | 1                                        | 33 | 0 | 3    | 0                                        |     |   |       | 3                                        | 3   | 0 | 1.6   |
|               | A. duo<br>&<br>Asc. 1      | 8                                        | 12  | 1 | 4.4  | 9                                        | 8   | 3 | 3.3   | 1                                        | 44 | 0 | 4    | 3                                        | 8   | 0 | 4     | 21                                       | 12  | 4 | 3.9   |
|               |                            |                                          | 130 |   | 43.4 |                                          | 50  |   | 18.8  |                                          | 66 |   | 56   |                                          | 41  |   | 21.3  |                                          | 130 |   | 37.3  |
|               | A. duo<br>&<br>S. man      | 4                                        | 5   | 0 | 3.5  | 1                                        | 13  | 0 | 13.0  | 0                                        |    |   |      | 0                                        |     |   |       | 5                                        | 13  | 0 | 88.2  |
|               |                            |                                          | 3   |   | 1.5  |                                          | 2   |   | 2.0   |                                          |    |   |      |                                          |     |   |       |                                          | 3   |   | 1.7   |
|               | Asc. 1<br>&<br>S. man      | 0                                        |     |   |      | 1                                        | 2   | 0 | 2.0   | 0                                        |    |   |      | 0                                        |     |   |       | 1                                        | 2   | 0 | 2.0   |
|               |                            |                                          |     |   |      |                                          | 1   |   | 1.0   |                                          |    |   |      |                                          |     |   |       |                                          | 1   |   | 1.0   |
| Second slide. | A. duo<br>Asc. 1<br>S. man | 1                                        | 6   | 0 | 6.0  | 4                                        | 24  | 0 | 11.0  | 2                                        | 16 | 0 | 10.5 | 2                                        | 3   | 0 | 2.0   | 9                                        | 24  | 0 | 7.3   |
|               |                            |                                          | 3   |   | 3.0  |                                          | 100 |   | 40.2  |                                          | 33 |   | 22.5 |                                          | 22  |   | 17.0  |                                          | 100 |   | 20.6  |
|               |                            |                                          | 1   |   | 1.0  |                                          | 2   |   | 1.5   |                                          | 3  |   | 2.0  |                                          | 2   |   | 1.5   |                                          | 3   |   | 1.5   |
|               | Neg.                       | 2                                        |     |   |      | 6                                        |     |   |       | 1                                        |    |   |      | 1                                        |     |   |       | 10                                       |     |   |       |
|               | A. duo<br>&<br>N. ams      | 1                                        | 4   | 0 | 4.0  | 1                                        |     | 1 |       | 1                                        | 1  | 0 | 1.0  | 1                                        |     | 1 |       | 4                                        | 4   | 2 | 2.5   |
|               | Asc. 1                     | 0                                        |     |   |      | 2                                        | 2   | 1 | 2.0   | 0                                        |    |   |      | 2                                        | 130 | 1 | 130.0 | 4                                        | 130 | 2 | 66.0  |
|               | S. man                     | 0                                        |     |   |      | 0                                        |     |   |       | 0                                        |    |   |      | 0                                        | 1   |   |       | 0                                        |     |   |       |
|               | A. duo<br>&<br>Asc. 1      | 0                                        |     |   |      | 1                                        |     | 1 |       | 0                                        |    |   |      | 1                                        |     | 0 | 1.0   | 2                                        | 1   | 1 | 1.0   |
|               |                            |                                          |     |   |      |                                          |     |   |       |                                          |    |   |      |                                          | 103 |   | 103.0 |                                          | 103 |   | 103.0 |
|               | A. duo<br>&<br>S. man      | 2                                        | 3   | 0 | 2.5  | 0                                        |     |   |       | 1                                        | 3  | 0 | 3    | 0                                        |     |   |       | 3                                        | 3   | 0 | 2.7   |
|               |                            |                                          | 6   |   | 4.0  |                                          |     |   |       |                                          | 5  |   | 5    |                                          |     |   |       |                                          | 6   |   | 4.5   |
|               | Asc. 1<br>&<br>S. man      | 0                                        |     |   |      | 0                                        |     |   |       | 0                                        |    |   |      | 0                                        |     |   |       | 0                                        |     |   |       |
|               | A. duo<br>Asc. 1<br>S. man | 0                                        |     |   |      | 1                                        | 2   | 0 | 2.0   | 0                                        |    |   |      | 0                                        |     |   |       | 1                                        | 2   | 0 | 2.0   |
|               |                            |                                          |     |   |      |                                          | 3   |   | 3.0   |                                          |    |   |      |                                          |     |   |       |                                          | 3   |   | 3.0   |
|               |                            |                                          |     |   |      |                                          | 2   |   | 2.0   |                                          |    |   |      |                                          |     |   |       |                                          | 2   |   | 2.0   |
|               | Neg.                       | 0                                        |     |   |      | 4                                        |     |   |       | 0                                        |    |   |      | 0                                        |     |   |       | 4                                        |     |   |       |

TABLE IV.

(I) *A. duodenale* and *N. americanus*.

|                                                                                  |     |     |     |     |     |     |                 |      |
|----------------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----------------|------|
| Total number of slides examined                                                  | ... | ... | ... | ... | ... | ... | ...             | 119  |
| " " " " found to contain eggs of Ad and Na                                       | ... | ... | ... | ... | ... | ... | ...             | 991  |
| No. of specimens in which Ad and Na were found only in the second slide examined | ... | ... | ... | ... | ... | ... | ...             | 10   |
| Average no. of eggs of all sizes found in positive slides                        | ... | ... | ... | ... | ... | ... | ...             | 3.08 |
| " " " " 70 mu. and over in length                                                | ... | ... | ... | ... | ... | ... | ...             | 3.07 |
| " " " " less than 70 mu. in length                                               | ... | ... | ... | ... | ... | ... | ...             | 3.1  |
| Maximum no. of eggs, all sizes, in one slide                                     | ... | ... | ... | ... | ... | ... | ...             | 24   |
| " " " " 70 mu. and over in one slide                                             | ... | ... | ... | ... | ... | ... | ...             | 17   |
| " " " " under 70 mu. " " "                                                       | ... | ... | ... | ... | ... | ... | ...             | 16   |
| Average size of eggs, all sizes                                                  | ... | ... | ... | ... | ... | ... | 68.6 mu. × 44.2 |      |
| " " " " 70 mu. or more in length                                                 | ... | ... | ... | ... | ... | ... | 72.7 mu. × 48.2 |      |
| " " " " less than 70 mu. in length                                               | ... | ... | ... | ... | ... | ... | 64.5 mu. × 40.3 |      |
| Maximum length of egg                                                            | ... | ... | ... | ... | ... | ... | 82 mu.          |      |
| Minimum " " " "                                                                  | ... | ... | ... | ... | ... | ... | 69 mu.          |      |
| Maximum width " " " "                                                            | ... | ... | ... | ... | ... | ... | 68 mu.          |      |
| Minimum " " " "                                                                  | ... | ... | ... | ... | ... | ... | 40 mu.          |      |

(2). *Asc. lumbricoides* and *S. mansoni*.

*Asc.*   *S. man.*

|                                        |     |     |     |     |     |             |              |
|----------------------------------------|-----|-----|-----|-----|-----|-------------|--------------|
| Total no. of specimens examined        | ... | ... | ... | ... | ... | 100         | 100          |
| " " " " found to contain parasites     | ... | ... | ... | ... | ... | 38          | 19           |
| Average no. of eggs per positive slide | ... | ... | ... | ... | ... | 47.5        | 2.04         |
| Maximum " " " " " "                    | ... | ... | ... | ... | ... | 130         | 6            |
| Average size of eggs                   | ... | ... | ... | ... | ... | 66 × 60 mu. | 158 × 77 mu. |
| Maximum length of eggs                 | ... | ... | ... | ... | ... | 72 mu.      | 176 mu.      |
| " breadth of eggs                      | ... | ... | ... | ... | ... | 66 mu.      | 108 mu.      |

TABLE V.

Comparison of the numbers of eggs occurring in infections by *A. duodenale* and *N. americanus* (Average number per slide).

|            |     |     |     |     | A. duodenale. | N. americanus. | Mixed,<br>A. duo.   S. man. |     |
|------------|-----|-----|-----|-----|---------------|----------------|-----------------------------|-----|
| Men        | ... | ... | ... | ... | 3.3           | 3.1            | 2.1                         | 2.3 |
| Women      | ... | ... | ... | ... | 3.7           | 4.9            | 5.4                         | 5.3 |
| Boys       | ... | ... | ... | ... | 6.7           | —              | 1.6                         | 2.3 |
| Girls      | ... | ... | ... | ... | 2.3           | 3.0            | 0.0                         | 0.0 |
| Both sexes | ... | ... | ... | ... | 3.8           | 3.5            | 3.5                         | 3.6 |

TABLE VI.

*A. duodenale*, *Ascaris lumbricoides*, and *S. mansoni*. Comparative prevalence in villages.

| Number of persons examined in each village. | Number infected with. |           |         |
|---------------------------------------------|-----------------------|-----------|---------|
|                                             | A. duo.               | Asc. lum. | S. man. |
| 4                                           | 4                     | 0         | 1       |
| 4                                           | 4                     | 0         | 1       |
| 8                                           | 5                     | 6         | 2       |
| 8                                           | 8                     | 4         | 2       |
| 8                                           | 7                     | 6         | 3       |
| 5                                           | 5                     | 2         | 0       |
| 8                                           | 8                     | 2         | 0       |
| 8                                           | 7                     | 3         | 1       |
| 8                                           | 8                     | 0         | 3       |
| 8                                           | 7                     | 2         | 1       |
| 8                                           | 7                     | 4         | 0       |
| 8                                           | 7                     | 0         | 1       |
| 4                                           | 4                     | 3         | 1       |
| 4                                           | 4                     | 2         | 2       |
| 7                                           | 6                     | 4         | 2       |
| 100                                         | 91                    | 38        | 19      |

A CASE OF MALARIAL DYSENTERY, BY A. H. BARCLAY, MEDICAL OFFICER, BLANTYRE.

L. V. W., age 30; admitted into the Blantyre Hospital on the 19th September; discharged 2nd October.

*On admission.*—Patient gave a history of dysentery for the past few days and complained of weakness, abdominal pain and tenesmus. During the day he passed 5 stools, offensive, and practically all mucus. Was ordered a tablespoonful of a saturated solution of the double sulphates, three-hourly. Milk diet.

*20th September.*—Milk was passed undigested and patient was placed on jelly and chicken tea. Sulphates continued. Passed 5 stools, first not containing much mucus; remainder as before.

*21st September.*—Stools 10, two mucus only, the rest mixed with mucus. Quinine solution, gr 15, given by mouth.

*22nd September.*—Eight stools, practically all clear mucus, blood flecked. Was given Bromide of Potash, gr. 10, as he had not slept well.

*23rd September.*—Two stools in 24 hours. Patient slept but was awakened by desire to stool. Much mucus in stools passed. Patient not inclined for food. Mixture of double sulphates discontinued and the following substituted, four-hourly, when awake:—

|                   |     |     |     |        |
|-------------------|-----|-----|-----|--------|
| Pulv. Ipecac. Co. | ... | ... | ... | gr. 8  |
| Bismuthi subnit   | ... | ... | ... | gr. 15 |
| Salol             | ... | ... | ... | gr. 5  |

*24th September.*—Had 6 stools, each consisting of pure mucus, no faeces. Was given a little Champagne at his own request. Temperature  $101^{\circ}$  at 3 p.m.

*25th September.*—Temperature still up. Passed a large slough, and blood-stained mucus. Five stools. Given an intra-muscular injection of Quinine, gr. 9. Powders continued.

*26th September.*—Was given another injection of Quinine, gr. 9. Also  $\frac{1}{2}$  oz. ricini. Bowels acted 4 times; only the first stool contained mucus.

*27th September.*—Injection of Quinine again given; also three of the powders. Passed 4 stools in 24 hours; these still contain mucus, but more faecal matter.

*28th September.*—Injection of Quinine. One stool only, still containing mucus. Three powders given.

*29th September.*—Large motion following a dose of  $\frac{1}{2}$  oz. ricini; little mucus. Feels well and has taken food well. Two powders given.

*30th September.*—Slept well. No motion. Has taken food well.

*1st October.*—Given 1 oz. ricini; large formed motion passed. Two powders given.

*2nd October.*—Slept well. Bowels acted once; no mucus.

Patient was discharged on the 6th October quite well. Seen 14 days later; stools normal, and no malarial parasites in blood.

*Remarks.*—Improvement in the patient's condition commenced from the day he was given injections of quinine; the magnesium and sodium sulphates previously administered having failed to act.

Pathogenic amaebs or cysts were never found in the stools.

OBSERVATIONS ON MEDICAL MATTERS IN THE DEDZA DISTRICT, BY  
J. B. DAVEY, MEDICAL OFFICER, S. S. I., DEDZA.

The notes appended are a digest of the observations, made in the course of the examination of 1,828 men, 2,590 women and 1,497 children—total 5,815—for Sleeping Sickness, in that part of the Dedza District which lies between the lake shore and the foothills. The actual number of days spent in this area, and therefore in recording observations, was fifty-five. A large proportion of the people live on the lake shore or on the banks of the four or five main streams which wind over the flat plain from the foothills to the lake: natives of the Yao, Angoni, Anyanja, and Amalawi tribes were represented.

In some cases, which are specified under the various headings, special observations on particular points were made on a number of people taken at random. The observations are classified under the following eighteen headings:—

- |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. Small-pox.</li> <li>2. Leprosy.</li> <li>3. Tuberculosis.</li> <li>4. Syphilis.</li> <li>5. Injuries and Accidents.</li> <li>6. Affections of Bones, Joints, Bursæ, &amp;c.</li> <li>7. Tumours.</li> <li>8. Cardiovascular.</li> <li>9. Ductless Glands.</li> </ol> | <ol style="list-style-type: none"> <li>10. Deformities.</li> <li>11. Eye.</li> <li>12. Ear.</li> <li>13. Nervous System.</li> <li>14. Mental.</li> <li>15. Skin.</li> <li>16. Congenital Defects.</li> <li>17. Miscellaneous Affections.</li> <li>18. Yaws.</li> </ol> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The examination consisted of an inspection of all uncovered parts of the body and enquiries were made into any abnormal condition observed. Any native who appeared to be out of health was examined to determine, as far as possible, the reason. My principal duty being to ascertain the existence or otherwise of Sleeping Sickness, such investigations as microscopical examination of fæces, urine and sputum were not made: nor, unless in exceptional cases, was complete physical examination of the chest and abdomen carried out. The difficulty of arriving at an accurate diagnosis of all the conditions met with, in a people on whose statements but very slender reliance can be placed and who were usually at pains to conceal any infirmity, is great and was increased by the want of an efficient interpreter. As a rule it was only possible to see any case on a single occasion and time could not be spared for elaborate investigations of cases which lay outside the direct line of work. Many points of interest must therefore have been missed, and many errors have crept into the observations recorded.

#### 1. SMALL-POX.

In order to gain an idea as to the extent to which small-pox has prevailed in the Dedza District, 1,011 adults and 244 children, living in 47 villages taken at random, were questioned and carefully examined. The results are summarised in Table I.

Table I. Shewing incidence of small-pox.

| No. examined.       | No. with definite signs<br>of past small-pox. | Doubtful. | No. without signs<br>and small-pox denied. |
|---------------------|-----------------------------------------------|-----------|--------------------------------------------|
|                     | Per cent.                                     | Per cent. | Per cent.                                  |
| 367 men ... ..      | 351 = 95·64                                   | 8 = 2·18  | 8 = 2·18                                   |
| 644 women ... ..    | 590 = 91·61                                   | 31 = 4·81 | 23 = 3·57                                  |
| 1,011 adults ... .. | 941 = 93·08                                   | 39 = 3·86 | 31 = 3·07                                  |
| 244 children ... .. | 166 = 8·603                                   | 19 = 7·79 | 59 = 24·18                                 |

No small infants are included. Under "Doubtful" are entered persons who claimed to have had small-pox but in whom no definite indications were observed.

*Native Vaccination.*—Small children bearing marks of native vaccination were noted on several occasions so that this practice has evidently not fallen into abeyance.

*After effects of Small-pox.*—The number of persons examined was 3,600.

*Eye.*—Two persons totally blind with disorganisation of both globes: one of these also deaf and speechless and reduced to a state of idiocy. Three with complete destruction of one eye, the other being healthy. Six with complete destruction of one eye and a dense corneal opacity in the other: practically blind. Nine with dense corneal opacities in both eyes: two of these with staphyloma of the cornea, another with anterior synechia: vision very poor. Thirty-one with dense opacities of one cornea: some of these complicated by

other lesions of the eye *e.g.*, adherent iris (adherent leucoma); total staphyloma, &c. Three with a macula of the cornea on both sides. Thirty-three with a macula of the cornea on one side, some of these with complications. Five with old iritis, two of these with occlusion of the pupil. One with ectropion and epiphora.

*Nervous System.*—One with paralysis of both long thoracic nerves, causing “winged scapulæ”: this is of considerable interest if correctly, as there seems no reason to doubt that it was, attributed to small-pox. Clifford Albutt mentions it as occurring very rarely after diphtheria, influenza and enteric but not in connection with small-pox. One with paralysis of the muscles supplied by the left musculospiral and left external popliteal nerves causing wrist and foot drop.

*Joints.*—One case of what had evidently been suppurative arthritis of the elbow joint.

*Bones.*—Six cases of old epiphysitis and osteomyelitis: in two of these the head of the radius was absent from its usual position and a bony mass, apparently the head of the radius, attached to the humerus and olecranon respectively: in one the 2nd right and in another the 3rd right metacarpal had been partially destroyed, the latter individual also had the head and neck of the radius missing, the right femur shortened  $2\frac{1}{2}$  inches, the right fibula shortened and opalities in both corneæ and is the husband of a woman with an old fracture of the spine mentioned elsewhere: another had old disease of the 3rd left metatarsal, and the sixth necrosis of portions of both acromial processes.

*Skin.*—Two cases shew enormous scarring, and one marked keloid of scars. One case of multiple pea like nodules (? fibromata) in the skin of the back and arms: probably nothing to do with small-pox. Many cases with black or nearly black spots level with the surrounding skin: these are mentioned elsewhere: sometimes attributed to small-pox.

## 2. LEPROSY.

Twelve cases of leprosy were seen and seven others reported by the sick reporters: as leucoderma is frequently diagnosed, by the natives, as leprosy the latter cases must be considered as doubtful instances. Of the twelve cases seen, five were of tubercular type, four of anæsthetic type and three mixed. One had leprous keratitis and in two the palate was affected. Two were youths of about 18 years of age and both presented severe mutilations.

## 3. TUBERCULOSIS.

No cases of pulmonary tuberculosis were diagnosed but as physical examination of the chest was not a part of the routine examination it is probable that cases were missed. Three old cases of spinal caries were seen, two in the dorsal and the third in the lumbar region: the latter presented scars suggesting old abscesses. One case of (?) tubercular disease of the knee joint. One case of ankylosis of the shoulder joint with sinuses. One case of caries of the second rib with abscess formation. Two cases of numerous scars in the neck suggesting tuberculosis of the lymphatic glands. One case of scarring over and thickening of the right clavicle (?) tuberculous.

## 4. SYPHILIS.

No cases of primary or secondary syphilis were diagnosed but it is probable that such cases, if they existed, would often escape detection in the examination, necessarily a cursory one, that was made. The French Fathers, who do a certain amount of medical work near their stations, mentioned the prevalence of the disease: I believe that they made the not unnatural mistake of diagnosing yaws as syphilis.

Of tertiary syphilis I saw a few cases: one man with the nose entirely destroyed; two women with destruction of the bridge of the nose, one of these had also a perforation through the hard palate and sunken nose to the surface, and numerous suspicious scars on the legs. One man was seen with very extensive gummatous ulcers of the shoulders, legs, forehead and scalp and dactylitis of the proximal phalanx of the 4th right finger: he was extremely emaciated and was said to have been in this condition for four years: under potassium iodide his condition was found, a month later, to have undergone remarkable improvement, the ulcers were nearly healed and he was able to walk about. A girl of stunted stature with depressed nose bridge and enlargement of the articular ends of several bones was seen: the lesions were attributed by her to yaws but it was more probably a case of inherited syphilis. A child with destruction of the septum nasi, loss of nose bridge and other indications of inherited syphilis was recorded. A man was seen with

extensive destruction of the nasal bones and cartilages, loss of the soft palate and a corneal opacity which were said to have been 10 years old: probably a case of inherited syphilis.

## 5. INJURIES AND ACCIDENTS.

Under this heading a number of interesting conditions were noted.

*Burns.*—Thirty-one persons exhibited lesions, of sufficient importance to record, due to burns: many of them were, no doubt, epileptics. The lesions noted comprised loss of one or more digits or of a larger part of a limb and deformities consequent on scar contraction: of the latter some extreme cases were seen such as a hand firmly adherent, by its ulnar border, to the forearm.

*Injuries by Animals.*—Includes a miscellaneous collection of cases:—

*Crocodile injuries*—Five cases:—

(i). Foot missing and knee ankylosed; (ii) ankylosed shoulder; (iii) and (iv) multiple scars; (v) all the toes of the right foot missing.

*Leopard injuries.*—Two cases:—

(i). Limitation of movement of elbow joint, due to cicatricial contraction; (ii) Multiple scars.

*Snake bite.*—The following eight cases attributed their lesions to snake bite:—

(i) to (v) one or more digits missing; (vi) and (vii) ankylosis of the joints of and wasting of several fingers; (viii) complete opacity of both cornea, said to have been caused by snake venom entering the eyes. The headman of a village was reported to have recently died of snake bite.

*Bush pig injury.*—One case of loss of a finger.

*Goat injury.*—One case of total disorganisation of the eyeball.

*Fractures.*—Nineteen cases of old fracture were observed:—

One of fractured humerus and olecranon, the latter ununited; three of fracture of the radius, two having a good functional result, the third with ankylosis to the ulna at the seat of fracture and therefore loss of supination and pronation; one Colles' fracture with gross deformity; one fracture dislocation at the left elbow, the head of the radius being unreduced; one fracture at the wrist, its exact nature could not be determined; three Potts fracture, one with fair and the two others with bad result; three other fractures in the vicinity of the ankle, the exact lesion was not determined, all with much deformity; one fracture dislocation (?) at the right ankle and other injuries of the foot resulting in extraordinary deformity; one compound fracture of the tarsus and metatarsus caused by a gun accident, great disablement resulting; one of the lower jaw, union with gross deformity; one of the clavicle with good bony union; one case of multiple fractures and other injuries. This was a woman, aged about 30, who fell from a tree when a girl: she evidently had a compound fracture of both the radius and ulna near the right wrist joint which has resulted in a mass of callus uniting the two bones with much deformity: between the 3rd and 4th left metacarpals is a cleft extending into the middle of the palms: at the occipital region a deep pit is felt in the skull and anterior to this the surface of the bone is very irregular and there are three large scars in the scalp adherent to the bone: encircling the neck is a large scar and the spinous processes of the lower cervical vertebræ are thickened and irregular. She has made a good recovery therefore from the following injuries:—(a) Compound fracture of radius and ulna; (b). Fracture, probably compound, of the vault of the skull; (c). Fracture of portions of the lower cervical vertebræ; (d). Wound separating the 3rd and 4th metacarpals.

One fracture of the spine: this is a remarkable case of a woman on whom, when a child, a tree fell. The dorsal spine is on a plane about 1 inch anterior to the cervical spine and the deformity is obvious at a distance: flexion and extension of the head are normal but rotation is very deficient: the vertebral borders of the scapulæ can be made to meet in the midline with the greatest ease. The neck seems to be shortened, and on tracing down the spinous processes with the finger that of the 1st dorsal is found to be sunk in a deep hollow. I can only suppose that she sustained a fracture dislocation between the 7th cervical and 1st dorsal but am unable to explain the absence of signs of injury to the cord. She is, very appropriately, the wife of the man referred to under "Small-pox," with  $2\frac{1}{2}$  inches shortening of the right femur and other lesions.

*Dislocation.*—A case of unreduced dislocation at acromio-clavicular joint was observed.

*Injuries to the Eye.*—probably many of the lesions enumerated below and attributed by the patients to injury were, in reality, caused by disease; thirteen cases of dense corneal opacity, due to wounds by bango reeds, &c.; eleven cases of total destruction of the eyeball—one of them mentioned above as having been caused by a goat: one of them is bilateral, the result of a dynamite explosion at Salisbury; one case of deformity of the globe caused by an arrow wound of the sclerotic; some minor injuries, such as slight opacities of the cornea caused by wounds with bamboos, &c; injuries of the sclerotic, &c.

*Injuries to the Pinna.*—Two cases in which half of the pinna was missing, cut off by other natives: mutilations of this nature are rare in Dedza district compared with the frequency with which they were seen in North Nyasa where they were performed by the Awemba; one case of gross deformity, the result of boring a hole in the pinna.

*Missing Phalanges and Digits.*—Thirty-nine persons were noted as having digits, or parts of them, missing as a result of wounds with hoes, arrows, &c.

*Miscellaneous Injuries include.*—Ten cases of various injuries of the hands or feet, one case of ankylosis of the knee joint due to a mining accident, one case of periostitis of the tibia, one case of fixation of the elbow joint by a contracted scar, one case in which most of the teeth had been knocked out, one case of an enormous hæmatoma of the neck caused by the rafter of a house falling, 6 bones, joints, bursæ, &c.

Ten cases of ganglion were seen. Dupuytren's contraction of the palmar fascia is not uncommon. The practice amongst the Achipeta of protecting the anterior fontanelle is noteworthy: a cake of ashes and castor oil is applied or a long tuft of hair grown over the fontanelle; this is supposed to strengthen the fontanelle. The practice of carrying heavy water pots on the head, with a circular pad ("Kata") interposed, produces a circular eminence over the sagittal suture. A case of housemaid's knee was found: this condition seems to be less common than would be expected. A woman presenting a cystic tumour—probably an enlarged bursa at the upper part of the vertebral border of the scapula was seen. Machillaman's bursa was noted on a few occasions.

A form of arthritis, affecting principally the fingers of elderly people and corresponding to the general progressive (chronic) form of Arthritis Deformans, was frequently met with. In one old woman examined both elbows were fixed at an angle of about 120° and the fore-arms in a position midway between supination and pronation, the wrist joints and the interphalangeal joints of the hands were much enlarged: the knees were unaffected: It was described as being congenital and the patient stated that her father and her three children, who all died younger, were similarly affected but I incline to a diagnosis of Arthritis Deformans.

Very remarkable deformities of the toes were frequently observed in old people, and in many cases there was no history of injury to account for them. A woman with considerable bony enlargement of the os calcis was recorded: there was no history of injury. I was quite at a loss to account for this condition until, under the heading of "Big heel endemic enlargement of the Os Calcis," I found a description in Manson's work of a disease of natives of the Gold Coast and of Formosa corresponding to the case I had noted. This is, I believe, the first case recorded from this country. I saw also, in a man, a very similar condition affecting the olecranon process.

Two cases of a disease called "*Kapechipecthi*" were seen: they were absolutely different in their manifestations and I have the greatest doubt as to the term indicating any definite clinical condition. The first case was that of an undersized woman who had thickening about the right elbow, shortening of the right clavicle and an œdematous condition of the left leg: there were no definite signs of syphilis but there was a clear history of yaws and possibly the lesions were a result of that disease. The second case was that of a man who exhibited flat topped, raised papules on the arms, chest and abdomen: the legs were free: the duration was said to have been five years and the disease was said to have been acquired from his wife. About the elbow the lesions were confluent and scaly and bear some resemblance to psoriasis.

A number of cases of Juxta-articular Nodules was observed corresponding in all respects to the condition described under that heading in Castellani's book (1st edition) and again mentioned in the Journal of the London School of Tropical Medicine, Vol. II, Part 2, p. 133 where it is stated that French observers have found similar nodules to contain *Filaria*

volvulus. My observations compel me to the belief that they are a result of yaws and they will be dealt with under that heading. It may, however, be mentioned that one was excised and scrapings were carefully examined without finding anything resembling filaria: nor were any protozoa or micro-organisms detected, and another was aspirated with a similar result.

#### 7. TUMOURS.

Lipomata: a small lipoma situated in the midline about 2 inches above the umbilicus is frequently seen; eleven cases of lipomata in other situations were noted. Papillomata, especially a small multiple form on the face of elderly people, are not uncommon. Fibromata: two cases were recorded, on the cheek and forearm. Dermoid: an infant with a congenital cystic tumour at the outer angle of the orbit was examined. Tumours of Gland: a tumour, probably a chondrofibroma, of the parotid with a long history a small tumour probably a cyst, of the submaxillary gland and several cases of enlarged thyroid mentioned under "Ductless Glands" were seen. Two cases with symptoms suggestive of mediastinal growth came for examination: one was a woman with an area of impaired resonance over the upper part of and to the left of the sternum and a very loud systolic bruit down the sternum; the left branchial and radial pulses were very small and appreciably retarded, the classical signs of aneurysm were absent: the other was a man who is referred to elsewhere as having paralysis of a portion of the ulnar nerve; his signs were very similar to those of the first case. Possibly both were of the nature of syphilitic or tuberculosis deposits.

#### 8. CARDIOVASCULAR.

A few cases of valvular disease of the heart were diagnosed, but examination of the heart was not a part of the routine and the number of cases found was small. Varicose veins in the legs were occasionally seen.

#### 9. DUCTLESS GLANDS.

Eleven persons, all women, were noted as having enlarged thyroid glands, in two of these there were definite tumours; none presented symptoms of Graves Disease. A typical achondroplastic dwarf was seen: he measured 3 feet  $11\frac{3}{4}$  inches in height.

#### 10. DEFORMITIES.

Two cases of talipes equinovarus, the result of infantile paralysis, were recorded. Hallux valgus was observed, not uncommonly, principally in elderly people and in many cases associated with marked Pes planus. This is interesting in view of the part which pointed boots are held to play in its etiology. It seems at least possible that pesplanus, which is common in natives, produced possibly by carrying heavy weights on the head, may lead to hallux valgus by throwing the weight of the body on the inner side of the foot and great toe.

#### 11. EYE.

Chronic ophthalmia, "*Nkungudza*," with entropion and trichiasis was frequently noted. Corneal opacities, apart from a history of injury or as a consequence of small-pox, were noted on twelve occasions: one was associated with cataract and another complicated by anterior synechia: two were bilateral: they were said to be the result of corneal ulcers.

Ten cases of cataract were noted: one, combined with Coloboma Iris, is mentioned under "Congenital Defects": five were undoubtedly senile, some of these being double: one was associated with leprosy: two were thought to be lamellar cataracts and one was associated with a corneal opacity.

Arcus senilis was frequently observed in elderly people. Strabismus was noted on a number of occasions. Pinguecula is not uncommon and evidences of old iritis were seen occasionally. A peculiar linear scar horizontally across both upper lids was observed sometimes and has been seen in other districts: it is said to be congenital but this does not seem to be a probable explanation. A case of double ptosis was seen.

#### 12. EAR.

A few cases of otorrhoea were seen: this condition is treated by inserting a pounded young castor oil bean into the ear: this must be done by a cousin of the patient. Amongst the Amang'anja a drop of blood from the finger of a cousin is introduced into the ear.

## 13. NERVOUS SYSTEM.

Ten persons with lesions suggestive of Infantile Paralysis were seen: in two of these an arm and in the rest a leg was affected. Epilepsy is not uncommon and several persons with the scars of severe burns, sustained during seizures, were seen. Many cases of tremor were noted: some bore a close resemblance to cases of Paralysis Agitans, others appeared to be senile. A case of paraplegia with signs pointing to a combined sclerosis of the cord, possibly syphilitic, was recorded. A man with atrophy of the muscles of the thenar and hypothenar eminences, and of the interosseous spaces of the left hand, the muscles supplied by the deep branch of the ulnar nerve—attributed this condition to a burn in childhood but no signs of a burn were detected. This man is also referred to, under "Tumours," as having signs suggestive of mediastinal new growth.

## 14. MENTAL.

Six cases of deaf-mutism, 2 idiots, 1 senile dementia and a few other of insanity were seen.

## 15. SKIN.

Leucoderma, "*Pupa*": nine cases were seen in two of which it was attributed to burns: this condition is confused, by the natives, with leprosy when it develops in adult life. Tinea of various kinds is extremely common: tinea and a black form, ? tinea nigra, were seen on the face and neck, sometimes together: a condition closely resembling tinea intersecta was seen. Impetigo and acne "*Zisungu*" is not uncommon: amongst old people a dry scaly condition of the skin, presumably an atrophic change, is seen: psoriasis was occasionally noted and ulcers of leg frequently. Small multiple papillomata "*Njeriweri*" were frequently seen on the faces of old people and may perhaps be caused by chronic irritation of dirt for many of these people were offensively unwashed. They were, however, not infrequently attributed to someone having expectorated over the patient.

Naevi are not uncommon both in the form of port wine stain and raised naevi. A curious case of hyperkeratosis of the hands and wrists, said to have been caused by making beeswax, was noted. Sycosis is not uncommon in men. A case presenting lesions corresponding to those described by Castellani under the heading "*Pyosis Tropica*" was seen. Callosities are frequently seen in unusual situations: the habit of interlocking the fingers of the clasped hands when holding the "*munsu*" in pounding maize leads, in some cases, to an extraordinary development of thickened epothelium. They are also seen in positions such as on the heads of the metatarsals where it is difficult to account for them.

Black or very dark purple spots are frequently seen on the face and arms: they are usually small and the skin is otherwise unchanged. Some persons attributed them to small-pox and others said they were congenital, but I have not observed them on babies and am inclined to doubt the correctness of both explanations. In some cases they had not been noticed until I called attention to them. Possibly they are a form of freckles.

Marks like yaw scars and raised scars were attributed to the attack of the curious insect *Enyaliopsis petersii*, locally called "*Vimbri*"; an account, by Dr. Stannus, of the mode of attack of this insect has, I believe, appeared in the Bulletin of Entomological Research: as I have observed, droplets of fluid seem to be suddenly shot forth from some part of the head end of the insect; these were quickly washed off with water and no effects were produced.

## 16. CONGENITAL DEFECTS.

Such careful and exhaustive observations on the congenital defects of the native of Nyasaland have been recorded by Dr. H. S. Stannus that this section is included with some hesitation and without any pretensions to originality.

*Congenital Defects of the Hands and Feet*: 1,200 men, 1,625 women and 683 children were specially examined for indications of accessory fingers: the results are shewn in Table 2.

TABLE 2.  
Rudimentary 6th finger present.

| No. examined.       | R. hand only. | L. hand only. | Both sides. | Total. | Percentage affected. |
|---------------------|---------------|---------------|-------------|--------|----------------------|
| 1,200 men ... ..    | 6             | 10            | 19          | 35     | 2.92                 |
| 1,625 women ... ..  | 3             | 10            | 16          | 29     | 1.78                 |
| 683 children ... .. | 1             | 12            | 10          | 23     | 3.37                 |
| 3,501 total ... ..  | 10            | 32            | 45          | 87     | 2.48                 |

The higher percentage found in children may be due to the custom of removing accessory fingers in infancy: with advancing years all traces of their existence would tend to disappear. Including the above, 101 such cases were noted in all: the right hand only in 13, the left hand only in 35 and both hands in 53 cases being affected. In only 2 cases, out of 1,828 men and 2,550 women, was an accessory toe observed, and this was fused with the 5th toe, but had a separate nail in one case, and in the other was a mere rudiment. Both were women. Five persons shewed suppression of a toe—one man, four women: 3 of them were affected only on the left side, the other two on both sides.

The following instances of hypertrophy and its converse of individual toes were observed:—Of 1,828 men, 5 shewed shortening of the 4th toe on both sides and one on the right side only; of 2,550 women, 3 shewed shortening of the 4th toe on the right side only and one on the left side only: one shewed shortening of the 2nd toe on the right side only and two shewed lengthening of the 2nd toe on both sides: one shewed all the toes, except the great toe, abnormally short and of approximately the same size on both sides. Two instances of abnormally great development of the 3rd right digit were observed in the 4,378 adults examined: in another case the right little finger was only one inch long, but I am a little doubtful as to this being a congenital affection although stated to be so.

The metatarsals and metacarpals participate in these curious cases of over and under development of fingers and toes which are frequently attributed to the mother having partaken of some unusual food e.g. baboon, porcupine, &c., whilst pregnant. Eating elephant meat while pregnant was adduced as the cause of a child being born with only four toes on each side.

Two cases of abnormal shortness of the right humerus were observed: one of these was one of the cases noted above of abnormally long 3rd right metacarpal and phalanges. Two instances of what were probably intrauterine amputations were observed: in one all the fingers of the right hand were missing and in the other only one toe—the little toe—remained on the right side and only stumps  $\frac{3}{4}$  inch long of all the left toes. Two cases of congenital dislocation of the hip joint and one of spina bifida occulta in the lower dorsal region with a cicatricial condition of the overlying skin were seen: congenital ptosis was observed also. A man having an additional separate point of origin of the sternomastoid muscle, from the middle third of the clavicle, presented himself for examination. Six cases of auricular appendages and one of microtia with absence of the external auditory meatus were noted.

A female infant albino aged about  $2\frac{1}{2}$  years was seen: the hair was flaxen, the irides greyish green towards the periphery and brownish near the centre: there were no freckles on the skin: horizontal nystagmus present, the mother was seen and appeared normal, the father, not seen, was said to be normal; they had no other children. A baby with skin of a yellow ochre colour, brown irides and dirty looking flaxen hair, probably an example of xanthinism, was seen: the parents were seen and were of normal colour: they had no other children. Two albino children, sisters, were reported by one of my native capitaos but were not seen by me. In addition to the albinos mentioned above three cases of variation from the usual deep brown colour of the iris were seen: (1) a girl with olive coloured irides: her skin was of the light copper colour not infrequently seen amongst Yaos: her hair black, (2) a man with bluish grey irides with brown spots on them, (3) a man with very light brown irides. The skin and hair of the two latter were of the normal colour. One case of coloboma irides, accompanied by a congenital cataract, was observed. Men with nipples as large as those of a women were occasionally seen, and of 1,200 men 9 had an additional rudimentary nipple on the right, 7 on the left and 4 on both sides: one of the latter had two additional nipples on the right and one on the left side. The usual position of these additional nipples was 1-2 inches below and slightly internal to the true nipple. A woman with what appeared to be an additional breast, but without nipple, just beneath the right anterior axillary fold, was seen.

A partial median hare lip was seen on several occasions and in some persons an absence of pigment in the lips, said to be congenital, was noted. A woman with remarkably long and sharply pointed chin, said to be congenital, was examined. A man presenting a remarkable variety of abnormalities, all said to be congenital, was found at Kachimba's. There was very marked spinal curvature (angular) in the cervical and upper dorsal regions and an immense mass of (?) glands on the left side of the neck: large masses below both mastoid processes: lipomatous tumours on the left side of the chest and on the back of the right arm, the skin over the latter tumour being covered with long hair. The left hand was wasted and claw-like, the muscles of both forearms very poorly developed.

The left leg was shortened considerably. In spite of all these infirmities he was active, had recently built himself a substantial hut, was married and appeared to enjoy good health. In the absence of works of reference I can offer no explanation of the case.

#### 17 MISCELLANEOUS AFFECTIONS.

*Ainhum*.—Four cases were seen : the little toe only was affected in each case. Three were women and one a man.

*Chiggers*.—Three cases only seen and in all of them the disease was stated to have been acquired in other parts of the country—Zomba and Mlanje—where the patients had been working. The *Dermatophilus penetrans* has not, I think, established itself in the country bordering the lake in Dedza district.

*African Tick Fever*.—No cases were seen and the existence of the disease, though frequently enquired for, was always denied. The *Ornithodoros moubata* was found at Sani Maganga on the lake shore and in the tengatenga rest house at Dedza, in small numbers only in each case. In North Nyasa district the disease is widespread and one's house-boys and carriers were frequently incapacitated for a time by the disease when travelling : in the part of Dedza district under consideration no case was found although the blood of a number of sick carriers and others was examined.

*Elephantiasis*.—No case was seen—another striking contrast with North Nyasa—and the occurrence of the disease was denied.

*Bhang smoking*.—The characteristic cough of the hemp smoker was not infrequently heard at night, but no definite information as to the prevalence of the practice can be given.

*Pellagra*.—A careful look out for signs of this disease was kept : four cases with the cracks at the corners of the mouth, which Dr. Stannus has shewn to be a frequent manifestation of the disease, were noted and one of these had an eczematous condition near the elbows : one, when revisited a month later, had apparently quite recovered and was in good health. One gave a history of having suffered in a similar way during the previous year whilst living near Zomba. It may, I think, be safely asserted that pellagra is absent or rare.

*Beriberi*.—No case at all closely resembling beriberi was seen.

*Pyorrhœa alveolaris* is common, and the teeth of old people are sometimes buried in a thick crust of tartar.

*Obscure cases*.—A man with his liver enlarged downwards to within an inch of the umbilicus was seen. The enlarged liver was smooth on the surface, and the increased size was iniform. He complained of no symptoms, and the duration was said to be many years. It seems probable that the condition was due to an infection of the liver by Trematodes.

A man was examined who had an eighteen months' history of headache and backache. He was emaciated and had a rapid pulse but the temperature was normal. No parasites were found in the blood, possibly a case of ankylostomiasis.

A case presenting symptoms very suggestive of Leishmaniasis was seen. The spleen was greatly enlarged and there was ascites and œdema of the feet. The patient was anæmic and greatly emaciated and died a few days after I saw him. Careful examination of the blood threw no light on the diagnosis. Splenic puncture was not performed.

A case described as "*Kasipa la mfuko*" was seen : other Medical Officers have drawn attention to the disease *Kasipa*, and Dr. Stannus has reported (Journal of the London School of Tropical Medicine, Vol. 2, Part 3, p. 175) that the native erroneously associates its etiology with a Gordian worm and that the name *Kasipa* does not signify any definite clinical disease. My case shewed evidences of old necrosis of several bones of the upper limbs and was said to have had the disease for 10 years : numerous scars and sinuses were present. It may have been a syphilitic or tubercular condition. The appellation "*la mfuko*" is said to refer to the way in which this variety of disease breaks out in first one part and then another : *mfuko*=a mole.

#### 18. YAWS.

At an early stage of the Sleeping Sickness Investigations it became evident that yaws was of frequent occurrence and widely distributed in the area under observation : for some time, therefore, all natives were examined and questioned for indications of the disease, recent or old. The numbers of natives examined, classified under their tribes, and the numbers of recent—that is to say, with actual granulomata—and old cases are shewn in Table 3.

TABLE 3. Shewing Incidence of Yaws.

| Tribe.       | No. of men examined. |    | Percentage. | No. of old cases.    |       | Percentage. | No. of women examined. |    | Percentage. | No. of old cases.    |       | Percentage. | No. of children examined. |    | Percentage. | No. of old cases.    |       | Percentage. | No. of infants examined. |   | Percentage. |
|--------------|----------------------|----|-------------|----------------------|-------|-------------|------------------------|----|-------------|----------------------|-------|-------------|---------------------------|----|-------------|----------------------|-------|-------------|--------------------------|---|-------------|
|              | No. of recent cases. |    |             | No. of recent cases. |       |             | No. of recent cases.   |    |             | No. of recent cases. |       |             | No. of recent cases.      |    |             | No. of recent cases. |       |             | No. of recent cases.     |   |             |
| Yao ...      | 427                  | 3  | 0.70        | 92                   | 21.55 |             | 662                    | 11 | 1.66        | 135                  | 20.39 |             | 276                       | 7  | 2.54        | 39                   | 14.13 |             | 181                      | 0 | —           |
| Angoni ...   | 244                  | 8  | 3.28        | 12                   | 4.92  |             | 350                    | 5  | 1.43        | 16                   | 4.57  |             | 94                        | 1  | 1.06        | 1                    | 1.06  |             | 120                      | 0 | —           |
| Anyanja ...  | 193                  | 2  | 1.04        | 35                   | 18.19 |             | 273                    | 6  | 2.19        | 45                   | 16.48 |             | 142                       | 7  | 4.93        | 17                   | 11.97 |             | 65                       | 1 | 1.54        |
| Amalawi ...  | 8                    | 1  | 12.5        | 3                    | 37.5  |             | 35                     | 6  | 17.14       | 12                   | 34.28 |             | 4                         | 0  | —           | 0                    | —     |             | 15                       | 3 | 20          |
| Achipeta ... | 92                   | 0  | —           | 18                   | 19.57 |             | 94                     | 1  | 1.06        | 26                   | 27.66 |             | 51                        | 0  | —           | 13                   | 25.49 |             | 19                       | 0 | —           |
| Total ...    | 964                  | 14 | 1.45        | 160                  | 16.6  |             | 1414                   | 29 | 2.05        | 234                  | 16.55 |             | 567                       | 15 | 2.46        | 70                   | 12.35 |             | 400                      | 4 | 1.0         |

On the accompanying map\* the villages, where recent cases of yaws were found, are underlined in red ink; it will be seen that cases are distributed throughout the area under observation but are most numerous along the Lintipe River: here, however, many of the villages are large ones. Excluding for the present the Amalawi, whose numbers are too small for comparison, it will be noticed that the Angoni who may, I think, be considered comparatively recent immigrants to this area, shew a far smaller percentage of old cases than the other tribes amongst which there is but little difference: that the percentage of old cases amongst children is only 25% less than in adults, this is in accord with the replies received as to age at onset, the average of 469 cases being 11 years; the ages of 57 cases with actual granulomata was also estimated and the average of these worked out to 19 years, persons as old as 55 were included, 27 of the 57 cases were estimated to be under 20 years of age: and finally that the percentage of old cases amongst men and woman is almost identical.

The distribution of and appearance of the lesions in "recent" cases presented no points of difference from the usual text book descriptions and need not be further discussed. As in other countries the existence of a "mother yaw"—"Kolo"—is recognised (Kolo=the mother of the village): this represents the primary sore and may remain unhealed for months or even years. The site of the "mother yaw" was stated to be as follows in the 464 cases in which information was forthcoming:—

TABLE 4. Site of Mother Yaw.

|                       |     |                   |
|-----------------------|-----|-------------------|
| Foot and ankle ...    | 66  | } Lower Limb 268. |
| Leg and knee ...      | 178 |                   |
| Thigh and buttock ... | 24  |                   |
| Genital ...           | 2   |                   |
| Trunk ...             | 49  | } Upper Limb 127. |
| Hand and wrist ...    | 26  |                   |
| Forearm and elbow ... | 42  |                   |
| Arm and axilla ...    | 59  |                   |
| Head and neck ...     | 18  |                   |
|                       | 464 |                   |

The scar of this mother yaw was inspected in all but the two genital cases, and was usually found to be a large thin pigmented area. In many cases yaws was said to have commenced in some lesion e.g. ulcer, wound, scabies pustule. Three cases in the granuloma stage presented a shiny macular eruption on the arms and, in one case, on the trunk also: in one case there was a considerable amount of fluid in the left elbow joint.

In the vast majority of old cases the character and position of the scars of the granulomata leaves little room for doubt as to the diagnosis but of the 464 cases amongst 2,945 men, women, and children examined, in 10 only could no definite scars be found. On parts such as the neck and axilla where the skin is loose the scars are very characteristic—finely wrinkled, rather thin and pigmented: a row of these scars is often seen partially encircling the neck or crossing the axilla: on the forearm and arm where the skin is tenser the scars frequently present a variegated appearance, some portions being lighter, others

\* Not printed.

darker than the surrounding skin : where bone is subcutaneous a pale thin smooth scar with surrounding pigmentation is usual.

In 80 out of the 394 old cases in men and women firm subcutaneous nodules, varying in size from that of a pea to that of a duck's egg were found in various parts of the body ; and in most cases these were attributed, correctly I believe, to yaws. They correspond closely to the description of "Juxta-articular nodules" given in works on Tropical Medicine, the cause of which is said to be unknown. The favourite site for them is on the subcutaneous border of the ulna, about 2 inches from the tip of the olecranon process : over the great trochanter of the femur and over the ligamentum patellæ and lower part of the patella are also common sites, in the latter situation they are sometimes associated with enlarged prepatellar bursa : occasionally then are seen near the malleoli and in one case on the zygoma. In 55 of the 80 cases in which they were present they were found on the ulna which was examined in every one of the 964 men and 144 women mentioned in Table 3 : in these 2,378 persons eight who denied having had yaws had precisely similar subcutaneous nodules on the ulna : seven of the eight had typical scars. The fact that of 394 old cases 55 (i.e. 13·96%) had subcutaneous nodules on the ulna, whereas of the remaining 1,984 persons examined who denied yaws, only eight (i.e. 0·40%) had them is, I think, strong evidence that these nodules are nothing more or less than a manifestation of yaws. They are comparable to gummata but have not the tendency of the latter to break down. In four cases subcutaneous nodules were found in persons still presenting unhealed granulomata but, in the great majority of the 80 cases they seem to have appeared after—in some cases years after—the acute stage of the disease was over. In most cases the skin was freely movable over them and they over the sub-jacent tissues ; but occasionally, on doubt as a result of trauma, the skin was adherent. In many cases they were multiple being present on both ulnæ, both patellæ and one or both great trochanters. They are painless, not tender, and of firm consistence. They were never found in children.

In the Journal of the London School of Tropical Medicine (Vol. 2. pt. 2, April 1913 p. 133) in a review of a paper by Ouzelleau it is stated that, in Mbomau, adult *Filaria volvulus* "were found in cysts or tumours, generally superficial, situated under the skin" and "the conclusion must be drawn that the volvulus cysts situated near joints do not differ markedly from those tumours known as 'Juxta-articular nodes.' Brumpt had observed many cases of these nodosities in Uganda and some on the Onelle (which forms with the Mbomau the head waters of the Ubangwi). In every case of this sort seen by the author he had punctured the tumour and found the embryos, and sometimes fragments of the adult, of *Filaria volvulus*."

I therefore punctured one nodule and excised two from the ulna in another case neither in the small quantity of material removed by puncture nor in scrapings from the cut surface of the excised nodules was anything resembling a filaria seen : microscopically, fragments of fibrous connective tissue but no parasites or organisms of any sort were found. On section the nodules were solid and tough and lay embedded in subcutaneous fat. I have recently had the opportunity of examining 327 adults and 266 children (natives) in another (Mlanje) district of the Protectorate, where, as far as I am aware, yaws is rare or unknown : no recent case of yaws was found, only two adults admitted having had yaws and both of these had subcutaneous nodules and characteristic scars, one had also beautifully pitted hands and feet : the ulnæ of all adults (327) were examined and no others were found with subcutaneous nodules. In the two cases mentioned the disease had been contracted whilst resident in other parts of the country. Thus of 327 adults examined in Mlanje 2 (i.e. 0·61%) had nodules whereas in Dedza they were present in 80 (i.e. 3·36%) out of 2,378.

The observations recorded above point strongly to these nodules being a sign of yaws and they as closely resemble the description of Juxta-articular Nodules in Castellani and Chalmers (p. 1137, 1st edition) that there can be little doubt about the identity of them. Under the tertiary stage of yaws Castellani mentions the occurrence of gummatus like nodules which soften and break down : the nodules to which I refer above have no tendency to softening. Since these observations were made I have read in the Tropical Diseases Bulletin (Vol. 1, No. 9, p. 530) that Moucket and Dubois have arrived at a similar conclusion regarding the significance of the nodules.

In many old cases typical examples of the pitted palms and, less often, of pitted soles described by Castellani, were observed and they form a very characteristic picture. As Castellani remarks, this condition may persist for years. During the later period of the active stage and subsequently a worm-eaten appearance of the palms and soles is not infrequently seen, which also persists for a considerable period and is sometimes followed by a dry horny condition with cracks at the skin creases : this latter is the cause of a considerable amount of disablement for it is much aggravated by manual labour, such as

hoeing, and, I was informed, breaks out year after year at the hoeing season. Cracks in the thickened epidermis of the heels is another sequel which causes some disablement. A mottled smooth condition of the palms is sometimes seen; the palm looks as though it had been ironed with a flat iron so that the creases and papillæ of the skin are less prominent than usual and the skin is mottled. In a few cases the backs of the fingers and less often the back of the hands have a dry shiny papery appearance which may affect the wrists, ulnar border of the hand or radial border of the thumb. In several old cases there had been dactylitis; in some of these loss of one or more phalanges had resulted. A peculiar appearance, resembling a section of an onion, was observed on the soles of some old cases suggesting that thickened epithelium had been shaved off or worn down: white patches were sometimes seen on the soles.

A severe case of yaws of two years duration was seen: the patient, a woman, acquired the disease from her child who was found to have typical yaws scars in the groins and axillæ: the child was infected from its father. Almost every finger was or had been affected by periostitis but the toes were unaffected: the face, shoulders, forearms and arms, hands, legs, and feet were almost universally affected with gunmatous-like ulcers, many of which were healing: a few typical granulomata were still present e.g. on the left forearm, and there was a subcutaneous nodule in the usual situation on the ulna. The palms were unaffected but the scars of healed lesions were seen on the soles. This case bears more resemblance to the tertiary stage described by Castellani than any other met with, but it will be noted that a few granulomata were still present.

In a review, in the Tropical Diseases Bulletin (Vol. 1. No. 9, p. 528) of a paper by Kerr, it is stated that he considers that yaws is an antecedent factor in the condition known as Gangosa. In Section 4, Syphilis, I have mentioned several cases of old destructive ulceration of the palate and nose: possibly some of these are examples of Gangosa. The last case mentioned in Section 4 was one with a clear history of yaws (at about 10 years of age) but syphilis was absolutely denied and no signs of it could be found.

Apart from cases of dactylitis, several cases of bone affections, apparently resulting from yaws, were seen: one of these, a woman, is mentioned in Section 6, under Kapechipechi. A man was seen with enlargement of the head of the right tibia, 1 inch shortening of the right leg and grating and crunching sounds on movement of the right knee joint: the right patella was thinned and the muscles about the knee wasted: his age was about 45, and yaws was contracted at 6 years of age or thereabouts. An old necrosis of the radius in a man who had yaws was also noted, no other cause was assignable for the condition. In one case considerable bony enlargement of the lower end of the femur was recorded in an old yaws case, and no other causative factor was determined for the enlargement.

In two cases wasting of the muscles of the front of the thigh was observed. I have not seen the contracture of the flexor muscles of the forearm, described as fairly common by Castellani. Enlargement of the interphalangeal joints of the fingers was seen fairly often, presenting a picture like the so-called gouty hands, but this was also seen in cases without any signs of yaws: in many of the cases where the primary lesion occurred on the hands and feet the neighbouring joint was enlarged, and in others the phalanx was missing. A peculiar verrucose condition of the foot and leg following a severe attack of yaws was noted.

There is a curious legend about the origin of yaws in this district where it is said to be a comparatively recent introduction. Two generations ago a man went out fishing on the lake in the afternoon: a very strong wind arose and he was compelled to stay out all night on some rocks. When he left his village he was healthy, but he returned next day covered with yaws and introduced the disease into the district. It is supposed that an evil vapour in the lake caused the yaws. This idea may have been suggested by the appearance of the little masses of rock whitened by guano, which bear no small resemblance to a crop of yaws.

#### *Conclusions.*

1. Yaws is endemic in the low lying area of the Dedza District adjoining the lake: about 16·5% of adults have suffered from the disease.
2. Males and females are affected in equal proportions.
3. A large amount of temporary and a not inconsiderable amount of permanent disablement is due to the disease and its after effects.
4. In about half the cases the disease is acquired before adult life is reached, and it is probably a potent factor in infant mortality.
5. "Juxta-articular Nodules" are a late manifestation of yaws.
6. Gangosa (Rhinopharyngitis Mutilans) probably occurs in Dedza District, but the observations recorded throw no light on its connection with yaws.

## PELLAGRA, BY H. S. STANNUS, MEDICAL OFFICER, ZOMBA.

Pellagra formed the subject of a special report by myself at the end of the last (financial) year. The subject matter of that report dealt principally with the features of the disease in the Central Prison, Zomba, where it was first diagnosed by myself in 1910. I propose to deal briefly with the facts of this disease since then.

Up to the 31st March, 1913, 131 cases of Pellagra had been diagnosed among the inmates of the Central Prison during the previous three years. Of these 83 remained in the Prison at that date, 34 had been released on expiration of their term of imprisonment, and 10 had died. Since that date 34 more cases have been diagnosed, making a total of 165 cases. Of the 83 who remained on 31st March 1913, 23 have been released, and 7 have died. Of the 34 new cases, 8 have been released and no deaths during the past 9 months have occurred. It is thus noticed that the deaths during the past nine months have occurred among the older cases. There remain therefore on December 31st, 1913, 79 cases in the Central Prison.

To indicate the seasonal incidence the table of my previous report is reproduced with additional cases for the last nine months added on. The dates refer to date of first symptoms observed. As regards symptomatology I have nothing to add: every type of case has now been met with both as regards distribution of rash, rapidity of progress of the disease, presence or absence of other symptoms, affection or otherwise of various systems, nervous, gastro-intestinal, etc. I will here again lay stress on the value of the peculiar soreness at the angles of the mouth as a diagnostic sign. This sign I was the first to call attention to, and my later experience has only gone to confirm my first opinion. Another symptom which I was the first to draw attention to, namely, a peculiar folliculitis occurring in pellagrins, I have observed in a number of other cases since I wrote upon that point, and only in Pellagrins.

The results of a number of post-mortem examinations on prisoners who died of the disease, together with the morbid histological findings, will be published by a collaborator with myself when the work is completed.

In my last report I stated that I hoped to carry out some experimental work with a view to throwing light on the etiology of this disease. Attempts were made with the help of Mr. Edward Ballard, Agricultural Entomologist, to work out the life history of the Simuliide occurring in Zomba, and to breed them for experiments, but during the small amount of time available for this work we were unsuccessful.

No animal experiments were made owing to the impossibility of obtaining animals, applications to District Residents for monkeys not bringing a single animal.

The food question as a point in etiology must remain unanswered also, as up to date no control of food supplies has been instituted. During the past half year the attendance of prisoners' women has been controlled, and has resulted in most of the prisoners being able to give to some woman his ration of rice to be cooked, or exchanged and the proceeds cooked for him, and I think one may say that on the whole the majority of prisoners have received in this way a more mixed diet than previously.

The whole of the rationing will shortly be under control, each prisoner receiving a proper cooked ration on a proper dietary scale. Turning again to the possibility of some arthropod acting as a carrier of the disease and putting aside the Simulium theory which remains much where it was a year ago, I cannot help thinking that the common bug of this country, *C. rotundatus*, may be the possible second host to the virus. As I have said above all experimental work has been impossible, but I look forward to the future, when the new Prison is built, to the possibility of making a direct experiment in this direction, as it has been found impracticable to render any cell in the Prison bug-free under the present conditions:—

Coming to cases outside the Prisoners:—

*Sikhs*.—No Indian troops are now stationed at Zomba.

*Warders*.—On March 31st, 1913, 6 cases had been observed shewing the diagnostic condition of the lips. Most of these cases have been under constant supervision since: the condition of lips has sometimes relapsed, but at no time has any rash been noticed. It is worth noting that they wear tunics with sleeves and collars and are therefore protected by

the sun. During the past nine months there has been an increase in the strength of the Prison Warders from 27 to 39. Six fresh cases of lip or tongue affection have been noted among this total, but no case with rash.

*Troops.*—The constant movement, recruitment, exchange from one company to another, etc., have made it impossible to keep count of various batches of men. Some 16 cases were noted in my last report among 150 men. Since then 9 cases shewing soreness of lips have been seen, with one case shewing a suspicious rash on arms.

*Camp women.*—During the same period 5 more women, wives of troops, have been noted suffering with symptoms (rash) of Pellagra.

During this period of nine months I have only seen one case of Pellagra in my native Hospital practice: I have been unable to travel in the district and therefore have no information about the general population.

Dr. Leys kindly sent me notes of a native in the Fort Johnston district prison with symptoms I should certainly consider warranted a diagnosis of Pellagra, but with this exception I have not heard of any other cases in the country.

I have not observed any European's employee with symptoms, and no European in Zomba has shewn symptoms of the disease.

---

## A BRIEF REVIEW OF SLEEPING SICKNESS INVESTIGATIONS IN THE FLY-AREAS OF THE MARIMBA, DOWA, DEDZA, SOUTH NYASA AND UPPER SHIRE DISTRICTS DURING THE YEAR 1913,

(Based on the reports submitted by Drs. Morgan, Conran, Davey and Sanderson, respectively)  
BY THE PRINCIPAL MEDICAL OFFICER.

---

### 1. MARIMBA DISTRICT.

This district was investigated by Dr. Morgan for a period of three months, in the course of which 11 infected natives were found. The Marimba district is naturally divided into two portions by a mountain range which runs from north to south, more or less parallel with the Lake shore. The tract of country lying between the Lake and these hills forms the greater part of the Kota Kota sub-division of the Marimba district. This sub-division is bounded on the north by the Dwangwa river, and on the south by the Chirua river. It consists chiefly of low-lying country, covered for the most part with forests of small timber, and is very swampy in many places. There are several rivers running from the mountain range to the Lake.

With the exception of the clearings on the Lake shore, and the rising ground immediately at the foot of the mountain range, *G. morsitans* everywhere abounds.

The native population is mainly concentrated in villages along the Lake shore and the larger rivers; most of the low-lying country is uninhabited. There are however a few small groups of villages scattered in this fly area. Most of the country in the immediate neighbourhood of Kota Kota has practically been denuded of timber by natives for fire-wood, and tsetse flies are accordingly rarely met with less than 5 to 8 miles beyond.

All the inhabitants of villages lying along the Lake shore, and on the banks of the Dwangwa and Chirua rivers, were visited and examined. Of the 11 cases diagnosed, 2 were found along the Dwangwa river; 6 in the neighbourhood immediately to the north and south of Bua river, about five miles from its mouth; 2 in a village due west of Kota Kota and about an hour's journey; and one about ten miles north of the Chirua river. All these cases were discovered by the Reporters of Sickness; none were notified by the natives themselves.

*G. morsitans* is encountered throughout the timbered low-lying country between the Lake shore and the rising ground at the foot of the mountain range. In the past a great deal of clearing has been done round Kota Kota and the larger villages; in such cleared areas no flies are to be seen, except occasionally when transported by travellers.

*G. brevipalpis* was found in many places along the Lake shore, more especially in the vicinity of rivers; several specimens were taken on marshy ground in the forest, many miles from the Lake.

Of 43 head of game shot, trypanosomes were found only in two, both water-buck. Domestic animals are rarely seen, and there are very few dogs and goats in and near the fly belt. The blood of 43 dogs and 25 goats was examined, with negative results.

Very extensive clearing operations have been commenced around villages situated in fly areas, but the natives visit the adjacent timbered fly-infested region for building material. All the main roads pass through the tsetse belt, and there is a constant passage of natives between Kota Kota and Nchisi, where much of the food supply is obtained.

## 2. DOWA DISTRICT.

Investigations in the Proclaimed Area of this district have extended throughout the year, and 49 cases of Sleeping Sickness have been diagnosed by Dr. Conran in 35 villages.

Of these villages, Kampidu contributed 5 cases; Mankwazi and Kombeza 3 each; Mtondo, Ngawachifu, Chimphanga, Muyanja, Chibugwe and Mtalamanja 2 each; and the remaining 26 villages 1 each.

Seasonal prevalence was most marked during the rains, the number of cases falling to a minimum towards the end of the dry weather; this variation also applied to flies, both as regards their distribution and number.

Work in the Area has been directed mainly towards (1) The diagnosis of all cases of the disease; (2) The introduction of prophylactic measures having for their object the protection of the population from the bites of the fly.

*Diagnosis of cases.*—The Sleeping Sickness Area is divided into five portions, in each of which is stationed a Reporter of Sickness whose duty is to travel about his area and take blood films from all cases of illness. These films are brought by runners to Ngani, and are there stained and examined by Dr. Conran. If a slide is positive, the Reporter is informed of the fact: if negative, and the patient makes a rapid and complete recovery, no further action is taken. If the slide is negative but the patient's condition does not improve, films are taken at weekly intervals until recovery or death, or until trypanosomes are found.

Every case diagnosed is visited after as short an interval as possible, and notes of the case taken. The visit is repeated whenever the Medical Officer passes through the village. During his periodical tours of inspection he is informed by the Reporters of Sickness, Police and Headmen of any case of sickness, and a fresh blood preparation is made *in situ* and examined for trypanosomes.

*Prophylaxis.*—During preceding years the natives had been encouraged to clear the bush which immediately surrounded their villages. On the last tour of inspection made by the Principal Medical Officer, it was decided to inaugurate a more extensive and systematic scheme of preventive measures.

All trees, bush and long grass were to be cleared for a distance of at least 300 yards round each village, the space so cleared to be either kept clear or planted with ground nuts or some other crop which would afford no shelter for fly. The reasons for this step were explained fully to each headman, who was made responsible for the state of his own village; at the same time one of the Sleeping Sickness Police was ordered to superintend the work in each large group of villages.

At first considerable opposition was encountered; some headmen refused to believe in the connexion between the fly and the disease; others were too indolent to bestir themselves in the matter; many started to fell a tree or two here and there in a desultory manner. However, persistent explanation, urging, and, when other means failed, threats of sending offenders to the Resident for punishment, in time had the desired effect; and work was proceeded with in a progressively more satisfactory manner until November, when it became necessary for the natives to prepare the land for maize cultivation.

Before work was temporarily suspended a belt, sometimes more sometimes less than 300 yards wide, had been cleared round every village in the fly area. Unfortunately the headmen did not show any desire to plant the clearings with ground nuts as suggested, and that idea was of necessity abandoned for the time being. As, during the hot weather at the end of the year, the fly increased and spread over a larger area, the benefit derived from the clearings became manifest. Villages formerly infested by fly were more free of them except for a few stray ones, introduced by travellers; these, however, did not long remain in the village but soon returned to the bush.

Wherever two or more villages were situated near one another they were to be linked together by means of roads, free from bush, for at least 150 yards on either side. This has been attempted in the case of the series of villages extending along the right bank of the Lipimbe river, and considerable progress has been made. During the next six months it is hoped that a fly-free road will be completed which will unite Msosa village, on the shore of the Lake, with the fly-free country to the west of Mtalamanja, thus enabling the thousands of natives who annually travel between the large villages on the Lake shore and the hinterland to do so without risk of infection. Incidentally, Europeans landing or embarking at Domira Bay will be able to travel to and from Dowa in safety.

Latrines have been constructed within the clearing round each village in order to obviate the necessity for using the bush for this purpose. Two trench latrines, one for each sex, have been made in every village in the fly area.

No attempt to enforce the removal or amalgamation of villages has been made. In the case of Kapindu, the village with the highest number of cases during the year, the headman grew alarmed and was easily persuaded to move to Mtonya. In another case, one of the headman of Sumaewa commenced to build a village in a particularly dense fly belt, but was induced to join Kawanga.

The notification of the natives, with regard to the danger incurred from bites of tsetse flies, has not been lost sight of. On every occasion when a village was visited the connection between the disease and the fly was impressed upon the headmen and elders. Missionaries were asked to instruct their native teachers in the matter, and the Reporters of Sickness and Police were ordered to inform every one in their respective areas. Owing to these measures a gradual but distinct alteration in the general attitude of natives toward the fly has been taking place.

### 3. DEDZA DISTRICT.

Dr. Davey investigated this district for a period of three months, without however finding any cases. Three tours of inspection were made in the area bordering the Lake, which, owing to the supposed absence of tsetse fly from other parts of the district, was considered the only area requiring investigation.

A total of 6,877 natives was examined, comprising 2,164 men, 3,162 women, and 1,551 children. On the second and third tours an examination was, on some occasions, made at a village previously visited, and the totals given above are therefore an over-estimation of the actual number of individuals examined; 5,815 being an approximately more correct total. The number of villages visited was 169, and the blood of 35 natives was examined for trypanosomes, with a negative result in each case.

The blood of 8 dogs and 15 goats was also examined, one of the former was found to be infected with *T. pecorum*, and three goats were also infected, two with *T. pecorum*, and one with *T. caprae*. The blood of an imported ram at Mlangeni was found to contain *T. pecorum*; it had recently travelled from Blantyre via Matope, and had doubtless been infected in passing through the fly area *en route*. The blood of two baboons, one wart hog and one bush-buck was also examined; only the last named was found to contain trypanosomes (*T. pecorum*).

Of tsetse flies, 736 captures were made; 82.74 per cent of these were males, and 17.26 per cent females. *G. morsitans* was the only species found. With regard to the distribution of *G. morsitans*, it may be said that they are absent or scarce for three or four miles inland from the Lake, and more or less numerous towards the foot-hills. To this general statement there are some exceptions; thus in parts where wooded country approaches the Lake, fly is to be found as a rule, but the narrow strip of palm and bush bordering most parts of the Lake, and bounded inland by grassy plains, does not support the fly. Fly was found to be most numerous between the Lifidzi and Lintipe rivers, from the foot-hills to the edge of the grassy plains, that is to say, over an area three or four miles broad. Compared with the Sleeping Sickness Area in the Dowa district both the area infested with fly and the actual numbers of fly are small.

### 4. SOUTH NYASA DISTRICT. 5. UPPER SHIRE DISTRICT.

Both these districts were investigated by Dr. Sanderson; the former for a period of two months, during which two cases were found; the latter for three months, with a similar result. Thus during a period of five months investigation of these districts four cases in all were discovered.

It is estimated that over 12,000 natives were inspected, and between 4,000 and 5,000 treated for various complaints. Of the four cases of Sleeping Sickness, two were found near Malembo, on the shore of the south-west arm of the Lake; one near Mpimbi; and the fourth near Litete on the Shire river, about 10 miles north of Liwonde. The first two

cases had undoubtedly been infected locally; the third probably; the fourth possibly; both the latter having visited the Dedza district and passed through the South Nyasa fly-belt *en route*.

Of the four cases, three had some degree of enlargement of the epitrochlear glands. This supports Dr. Shircore's view as to the importance of this symptom. An attempt was made to ascertain the frequency with which these glands are enlarged normally, that is to say in the apparently healthy native. 602 natives were palpated, and not one was found to have any enlargement of these glands greater than  $\times$  — (small, hard, and shotty). Of this degree of enlargement there were 11, or 1·82 per cent. Five of those having palable glands were further examined for blood parasites, with negative results. It would seem then that any degree of enlargement of the epitrochlear glands is rare in healthy natives, and as it is a frequent, though not a constant symptom in trypanosomiasis, Sanderson thinks this test may be given a trial as a means of detecting cases. It would be interesting to know at what period of infection these glands become enlarged, as an indication for choosing subjects for blood examination is greatly needed in the early stages. Moreover, if it is an early symptom, the systematic puncture of this gland, whenever it is found to be enlarged, may lead to the detection of cases, which, owing to scarcity of parasites in the peripheral blood, might otherwise be missed.

*Distribution of G. morsitans.*—The Marimba-Dowa-Dedza "belt" is continued through the South Nyasa and Upper Shire districts, and extends as far south as the neighbourhood of Matope. A second belt extends from Portuguese territory north-east of Mangoche, to the south, through the Liwonde district, and ends in the Blantyre district, a little to the south of the Blantyre-Matope road. The dry season, from July to November, is not a favourable time for observing *G. morsitans*, as the fly is more scarce at this time of the year than at any other. Moreover, the local prevalence of fly varies from day to day, and at different times of the day, probably owing to meteorological conditions.

*Distribution of village in relation to fly.*—On the whole this may be said to be favourable. The concentration of scattered communities, preliminary to the application of the District Administration (Native) Ordinance, is of great value as a step towards prophylaxis. More control is needed however in the making of food gardens, as there is a tendency to leave the bush in the immediate neighbourhood of the villages uncleared. This affords shelter for the fly, with the result that it is constantly present in some villages.

*Summary of Investigations.*

| Medical Officer.                | District investigated. | Duration of investigation. | No. of cases of Sleeping Sickness found. |
|---------------------------------|------------------------|----------------------------|------------------------------------------|
| Dr. Morgan ... ..               | Marimba                | 3 months                   | 11                                       |
| Dr. Conran ... ..               | Dowa                   | 12 "                       | 49                                       |
| Dr. Davey ... ..                | Dedza                  | 3 "                        | —                                        |
| Dr. Sanderson ... ..            | South Nyasa            | 2 "                        | 2                                        |
| " "                             | Upper Shire            | 3 "                        | 2                                        |
| Total number of cases found ... |                        |                            | 64                                       |

APPENDIX.

On consulting the Nyasaland Blue Book it will be seen that a large amount of medical work, chiefly among the native population, is carried on by the various local missionary bodies.

There are only four missions, however, who employ qualified medical men. These are:—(a) The Universities Mission to Central Africa, with one doctor; (b) The Livingstonia Mission of the United Free Church of Scotland, who, in Nyasaland, have a staff of about five medical men; (c) The Church of Scotland Mission, to which two doctors are attached; one of these however is at present employed in the adjacent Portuguese territory; (d) The Dutch Reformed Church Mission, who employ one medical man in Nyasaland.

At the suggestion of the Governor, Missions employing qualified medical men were invited to submit returns of their Hospital and Dispensary cases, to enable a more comprehensive view being taken of the diseases which are annually dealt with in the Protectorate. For various reasons, however, the response made this year is limited to the return which is appended, and for which I am indebted to Dr. Caverhill of the Church of Scotland Mission, Blantyre.

## BLANTYRE MISSION, BLANTYRE.

| Diseases.                                                           | Total Admissions.* |         | Deaths. |        |
|---------------------------------------------------------------------|--------------------|---------|---------|--------|
|                                                                     | Male.              | Female. | Male.   | Female |
| INFECTIVE DISEASES.                                                 |                    |         |         |        |
| Chicken-pox ... ..                                                  | 2                  | —       | —       | —      |
| Dysentery ... ..                                                    | 30                 | 4       | 4       | 1      |
| Leprosy :—Nodular                                                   | 5                  | 2       | 1       | —      |
| Anæsthetic                                                          |                    |         |         |        |
| Malaria :—Aestivo-autumnal ... ..                                   | 61                 | 24      | —       | 1      |
| Measles ... ..                                                      | 1                  | 1       | —       | —      |
| Pneumonia ... ..                                                    | 10                 | 1       | 3       | —      |
| Syphilis :—Secondary ... ..                                         | 3                  | 4       | —       | 1      |
| Inherited ... ..                                                    | 1                  | —       | 1       | —      |
| Tetanus ... ..                                                      | 1                  | —       | 1       | —      |
| Tuberculosis ... ..                                                 | 4                  | 1       | —       | —      |
| Yaws ... ..                                                         | 2                  | 3       | —       | —      |
| Rheumatism ... ..                                                   | —                  | 2       | —       | —      |
| Tuberculosis of Lungs ... ..                                        | 4                  | —       | 3       | —      |
| Muscular Rheumatism ... ..                                          | 1                  | —       | —       | —      |
| LOCAL DISEASES.                                                     |                    |         |         |        |
| Disease of the Nervous System :—Delusional Insanity ... ..          | —                  | 2       | —       | —      |
| Diseases of the Eye :—Conjunctivitis ... ..                         | 3                  | —       | —       | —      |
| Panophthalmitis ... ..                                              | 1                  | —       | —       | —      |
| Respiratory System :—Bronchitis ... ..                              | 14                 | 5       | 1       | —      |
| Pleurisy ... ..                                                     | —                  | 1       | —       | —      |
| Digestive System :—Dyspepsia ... ..                                 | 1                  | 1       | —       | —      |
| Ascites ... ..                                                      | 4                  | —       | 1       | —      |
| Lymphatic System :—Tubercular-Inflammation of Lymphatic Gland... .. | —                  | 1       | —       | —      |
| Suppuration of Lymphatic Gland ... ..                               | 1                  | —       | —       | —      |
| Generative System :—Urethritis ... ..                               | 4                  | —       | —       | —      |
| Paraphymosis ... ..                                                 | 1                  | —       | —       | —      |
| Dysmenorrhœa ... ..                                                 | —                  | 1       | —       | —      |
| Delayed Labour ... ..                                               | —                  | 24      | —       | 3      |
| Premature Birth ... ..                                              | —                  | 1       | —       | —      |
| Organs of Locomotion :—Tubercular Osteitis ... ..                   | 1                  | —       | —       | —      |
| "       Arthritis ... ..                                            | 1                  | —       | —       | —      |
| Connective Tissue :—Abscess ... ..                                  | 8                  | 3       | —       | —      |
| Diseases of the Skin :—Scabies ... ..                               | 1                  | —       | —       | —      |
| Tropical ... ..                                                     | 135                | 37      | —       | —      |
| Burns ... ..                                                        | 10                 | 2       | 1       | 1      |
| INJURIES. TUMOURS. POISONS.                                         |                    |         |         |        |
| Wounds ... ..                                                       | 24                 | —       | 1       | —      |
| Fracture ... ..                                                     | 5                  | 1       | —       | —      |
| Tumours ... ..                                                      | —                  | 1       | —       | —      |
| Poisons ... ..                                                      | 2                  | —       | —       | —      |
| ANIMAL PARASITES.                                                   |                    |         |         |        |
| Ankylostomiasis ... ..                                              | 68                 | 1       | —       | 1      |
| Bilharzia ... ..                                                    | 6                  | —       | —       | —      |
| Total ... ..                                                        | 415                | 123     | 17      | 8      |

\* Including cases remaining from the preceding year.

Many of the above cases were natives, sent in by planters, whose general physique was poor and ankylostomes were present but they could not be said to be suffering acutely from ankylostomiasis.

